

AMERICAN VETERINARY REVIEW

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AMERICAN VETERINARY REVIEW.

OCTOBER, 1912.

EDITORIAL.

EUROPEAN CHRONICLES.

PARIS, August 15, 1912.

THERMOPRECIPITIN IN THE DIAGNOSIS OF BACTERIDIAN ANTHRAX.—Some short time ago we received from Adjunct Professor Pio Silva of the Institute of Internal Pathology, Hygiene, Sanitary Medicine and Meat Inspection of the Veterinary School of Modena, of which Dr. Frederico Boschetti is Director, the following "*Contribution to the Study of the Reaction of Ascoli*" (*Thermoprecipitin*) in the diagnosis of Bacteridian anthrax. Peculiar circumstances have prevented its publication before this. We regret the delay and hasten to repair it.

"The analysis of the numerous works published until today on '*Thermoprecipitin*' Ascoli and Valenti (1), Valenti (2), Bierbaunn (3), Pfeiler (4), Roncaglio (5), Zibordi (6), Favero (7), De Gasperi (8), Granucci (9), Casalotti (10), Lebre (11), Negroni (12), Leoncini (13), Flori (14) has brought out its specificity with bacteridian anthrax. Examinations made on material made of meats, altered in various ways, or from healthy animals or from subjects affected with any disease and also the researches made with material from animals dead with similiar diseases, have always given negative results."

* * *

"The object of this study is to bring out the result of a new order of things relating to researches made with the *Ascoli reac-*

tion in applying it to the examination of *sausages*, made with meat from healthy pigs with that of cattle with anthrax. Besides, here are also recorded some controlling experiments made with material taken from animals dead with tympanitis, disease of youth, aviary pest, asphyxy and upon sausages in advanced state of putrefaction, seized at the public abattoir of Modena.

"The four samples of sausages examined first were made according to the ordinary manner of making the big Italian sausages called '*mortadelles*.'

"Each of these samples contained 40 grams of healthy pork, 20 of healthy fat and 40 of muscles of anthrax beef, chopped and mixed together in small pieces. To this mixture were added a small quantity of kitchen salt (2 grams), pepper (ogram. 4). Such mixture was then placed in a frying pan to dry them, during twenty-four hours, at a temperature gradually increasing, from 30° without going beyond 60°. The sausages can remain in this last temperature for about six hours.

"These researches were made twice in the 15 to 30 days following the making of the sausages, with the object of seeing if such certain lapse of time had any influence on *Ascoli reaction*. The concentration of the extracts was always 1/25. The sera of Ascoli used were number 4, 8 and 20.

"These researches have shown that *Ascoli reaction* is positive even if the muscle has gone through some of the manipulations (salting, drying) necessary for the making of the '*mortadelles*.'

"For me, this discovery has a very great importance, as it gives us the means to recognize if in the preparations of sausages there entered anthrax meat, a fact which as everyone knows is very difficult to establish with the usual ordinary means of researches.

"By opposition *Ascoli reaction* has always given a negative result when used: 1. with the spleen and blood of a steer dead with tympanitis; 2. with those of a calf dead, asphyxiated; 3. on those of a dog dead with distemper; 4. on those of a chicken dead with pest; and 5. on putrefying sausage of Italy.

"It is then permitted to conclude that *Ascoli reaction* is the

most powerful, the quickest and the surest means to diagnosticate bacteridian anthrax, and that particularly it can be resorted to in the research of the bacteridies in the species of preserved meats which have been salted or dried."

* * *

The contribution of Prof. Silva is closed with a complete bibliography on the subject:

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* * *

PRACTICAL WARNINGS.—I. *Cocaine and Its Dangers*.—Any horse that presents no apparent lesions, no painful and tender spot in some region of the anterior leg can be, generally speaking, considered as having the lameness located in the foot or in the phalanges. A long time before the use of local anesthetics this was admitted by practitioners, and the fact of the usefulness of cocaine has proved that they were right. It may be consistent, then, to say that it is, in many instances, without necessity that injections of cocaine can be resorted to so as to locate the seat of lameness, and indeed the positive results are characteristic as, after all, if some are negative and may cause an error, it may be due to an imperfect application of the anesthetic, although there are cases where the injection is negative without a proper cause to explain it, and yet neurotomy will remove the lameness. But if in some instances the injection is sometimes deceitful and can be the cause of error in diagnosis, there are others where it becomes a useless interference and often a dangerous one, and after all if it is a most elegant and demonstrative manner of diagnosis, one must at the same time bear in mind that it is not *without inconvenience nor without dangers*.

It is probable that these remarks will surprise many of those who have or are resorting to the injection of cocaine, perhaps in hundreds of cases, to detect or to confirm the diagnosis relating to the seat of lameness in an anterior extremity, but the warning was presented at a meeting of the *Société des Sciences Vétérinaires* of Lyon by Prof. Cadéac, who related three cases which, to say the least, showed a very great coincidence by the lesions presented by the animals to which injection of cocaine had been made. In the first case of a lame horse which was supposed by the owner to be lame in the shoulder, receives cocaine above the fetlock. The lameness is removed. The horse is about to be taken home to return later and be operated, when, after going on a walk 100 yards, he suddenly drops with a comminuted fracture of the first phalanx.

In a second case the lameness was attributed to lesion of the elbow, cocaine is injected and the lameness is removed after waiting a few minutes. At the demand of the owner the test is renewed, the animal is again free from lameness, but then after moving 50 yards on a walk, the fetlock suddenly drops and a fracture of the three phalanges is found at the post mortem.

A third case presents the same history, lameness of the right anterior leg, disappearing with an injection of cocaine, followed after walking a short distance with comminuted fracture of the first phalanx.

Three cases of osteitis, which might have ended by recovery, which had a fatal termination by the temporary removal of the pain which deceived the animal, made him put all his weight on his diseased phalanx with the fatal result, a crushing of the diseased bony tissue.

Of course the three cases of Prof. Cadéac are probably exceptional; I do not know if any similar ones have been recorded, but still the warning that they give is no less valuable.

2. CHRONIC NEPHRITIS AND ITS DANGERS.—On this disease, principally in dogs and cats, where it is more commonly observed amongst our domestic animals, and on the dangers of practicing surgical operations on "Bright's" animals, the *Annales de*

Bruxelles present an excellent article from Prof. Hebrant and his adjunct, Antoine.

Bright's disease, rarely observed in horses or bovines, is comparatively common in dogs and cats—and probably more so in this last animal. Rarely is a veterinarian called to treat such patients except in cases of severe complications. Without entering minutely in the description of nephritis, which is given by the writers who present the symptomatology and termination of the disease, the attention is called in a concise manner to five cases of animals which were submitted to surgical operations and died because of Bright's disease while they were in the best condition for recovery.

A dog had a cyst of the testicle. He is castrated. Forty-eight hours after he is found dead in his kennel. Post mortem showed lesions of chronic nephritis, no acute lesions of infection existed.

A cat is operated for a cyst of the mammæ, no fever follows. Death the third day with chronic nephritis.

Another cat had metritis. Hysterectomy is performed. No fever for three days. Result hopeful. Death on the third day with chronic nephritis. No peritoneal infection. Wound of the operation was all closed.

A dog is operated for perineal hernia. Three days after dog dies without fever by sclerotic nephritis.

A mammary lipoma is removed from a slut. Death the following day by nephritis.

The warning is plain: never operate an adult animal without having beforehand made a *chemical and microscopic examination of its urine*. If albumin and casts are found, do not operate, or look for post-operating mischief.

* * *

NEW NEMATOD IN CATTLE.—Mr. M. Piettre has presented at the Académie des Sciences the relation of the observations he made in studying from the chemical and histological point of view the processes of calcification of the various lesions of bovines

and principally of the frequency of calcareous deposits round the femoro-tibio-patellar joint, where on both lateral articular surfaces on the skinned cadaver, tracts are often observed, white yellowish in color, more or less irregular, and which after minute dissection are the invaded lateral and capsular ligaments.

The non-tuberculous nature of these deposits being established and after decalcification with picric acid, it was observed that in the middle of the fibrous tissue, more or less modified, there were many small alveoli, of various forms, empty or again filled with fine membranes, of various aspects and coloring easily with hematine. In the centre of the tendinous not calcified structures, Piettre has found a granulous tissue and besides those a fine kytinous membrane, and in one of the alveoli discovered a round worm, and in others in the middle of recent lesions, free embryos rolled upon themselves.

Similar alterations were found in numerous cases of investigations, twenty-six times out of thirty the parasites being located only in the fibrous tissue and almost exclusively in the thickness of the ligaments of the stifle joint, the external being more frequently invaded than the internal, or again in the tendons and fibro-cartilages of the joint and also in the tibiotarsal ligament. The cervical ligament was always free.

The lesions presented by the tissues involved assume three principal forms:

1. Simple dissociations of the fibrous tissues, which are pale yellow in color.
2. Small cavities hollowed in the thickness of the tendons with torn fibrous threads, some having yet their normal characters and others swollen, soft and also yellow in color.
3. Nuclei of conjunctive tissue with inflammatory aspect, brownish or light chocolate in color, easily differentiated from the surrounding fatty deposits.

In all these lesions parasites can be found in all stages of development, some alive, others dead. They are all surrounded with a cuticle impregnated with calcareous deposits.

Raillet and Henry classify the parasite in the family of

Filaridoe, gender *Onchocerca*. Piettre has proposed for it the name of *Onchocerca Bovis*.

There is no doubt that from the pathological point of view, and bearing in mind the importance of the disorders the parasite produces in the articular structure, the observations of Piettre may be of great value.

* * *

THE MUSEUM OF THE HORSE.—The little town of Saumur, already known to veterinarians by its military school, has now a new attraction, the only one of its kind in the world, a *museum of the horse*.

In the old historical castle of the city, after its having been used as an arsenal, a powder store house, then a jail, existing since the thirteenth century, repaired many times, and finally classified as an historical monument, a museum consecrated to the history and glory of the horse has recently been officially inaugurated.

Prepared since several years by the initiative and perseverance of the learned chief of the Veterinary Department of the School of Cavalry, Veterinary Major Georges Joly, the museum is now open.

It is divided in two sections, a chronologic and a specific. In the first are represented the ancestors of the horse, the hipparion, the horse of the tertiary ages and those of the polished stone, already domesticated, the solutreans that were used as food, the magdaleans that were already represented in sculpture; specimens of the breeds in the bronze and iron periods; the Assyrians, Egyptians, Greeks, Romans and Gallo-Romans. The horses of the Barbarians, that of Attila, of Charlemagne, William the Conqueror, Duguesclin, Joan d'Arc. Finally the horses of modern times, foreigners, Arabs, Normans, Anglo-Arabs, etc., draught and saddle horses, thoroughbreds, Flying-Fox skeletons.

In the specific group, numerous and rare collections are gathered. The complete history of shoeing, from the *Solea ferrea* of Romans, the many various hippo-sands of the Gallo-Romans, the

undulated shoes of middle-ages down to those of recent and modern times. Wooden and bronze bits, the Roman bridle and the many specimens used in the seventeenth century. Then the various harnesses, all richly mounted; those of the middle age, of the Renaissance, of the Cavalcadors, of the Musqueteers, of the Mexicans, etc., etc. And again vehicles of all epochs from the primitive carts down to the most recent models of the day.

A large and rich library of all kinds of works on Hippiatry completes this valuable museum.

Historically especially the museum of the horse at Saumur presents an unusual interest and there can be no doubt that it will prove a great means of education to veterinarians for everything relating to the horse, and also a rich nest of information for all those who will visit it.

* * *

BIBLIOGRAPHY.—If one should refer to the classical work on descriptive anatomy and look on that part of the circulatory apparatus which relates to the lymphatic system it will certainly appear to him as one which, by the description and the illustrations that are given, is of comparatively no great importance. Indeed in one which is much used on both continents, the whole subject is treated just in three or four pages and these are considering the lymphatic apparatus of equines. For the other domestic animals, the differential anatomy of the thoracic duct is given and that is all.

Recently, however, and especially since inspection of meat has been more or less thoroughly organized and put in practice, and that researches of lymphatic lesions have gained in importance, the anatomy of the whole lymphatic organism of the lower class of domestic animals and specially the food-producing animals, has been the subject of laborious work and of good publications which must be of great assistance to the sanitarian. The space that has been given to the illustrated articles of Godbille in *Hygiene de la Viande et du Lait*, to those of Lesbire and Panisset in the *Bulletin des Sociétés Scientifiques Veterinaires*

of Lyon, and the more recent ones in the report of the Bureau of Animal Industry, by Drs. Buckley and Th. Castor, are good evidences of the importance of the subject; and it is therefore with great satisfaction that we are able to welcome and announce the publication of a superior work which we dare say is the only one of its kind, viz.: *Das Lymphgefäßsystem des Rindes* (the lymphatic system of bovines), by Obermedizinalrat Dr. Herman Baum, professor of anatomy in the Higher Royal Veterinary School of Dresden, published by the Berlin house of August Hirschwald, N. W., Unter den Linden 68.

Dedicated to Prof. Dr. W. Ellenberger, the Rector of the Veterinary High School, the work is presented by a preface giving in a concise manner the plan and object of its contents, followed by the consideration of the four chapters in which the entire work is divided.

While in the first chapter generalities on the technique are given and followed by the preparations of the work and the dissections with remarks also on the terminology and generalities on the lymphatic glands and their vessels, afferent and efferent, in the others are separately considered the glands of the head, of the neck, of the upper part of the extremities, of the chest and its contents and finally of the abdomen and abdominal organs occupying the entire second chapter. This is followed by the anatomy of the thoracic duct and vessels, constituents and the lymphatics that belong to each gland. The entire description forms, of course, the essential part of the whole volume, which is composed of 165 pages and is illustrated by 78 figures presented in 32 beautifully colored plates.

German works on anatomy are always superior by their illustrations and we have already had opportunities in these pages to allude to their correctness, their neatness and the artistic manner with which German works on anatomy have been published. Certainly *Das Lymphgefäßsystem des Rindes* is fully as good as any that we have ever seen. The drawings are excellent and the coloration of the glands and of the vessels is of great advantage for the students who read the text. The six figures illustrating the

lymphatic system of the head, those of the neck, of the chest with the insertion of the thoracic duct, those of the extremities and the many given of the thoracic and abdominal cavities with their contents, those of the male and female genital organs, all in fact are so characteristic, well done and plain that one may readily make himself thoroughly acquainted with the entire subject by merely careful study of the illustrations.

The work of Dr. Baum is certainly unique, and one of which it can be rightfully said, that it fills a need greatly wanted. But it can also be added that it does it well and that it will prove of the greatest value to the student of anatomy, to the general practitioner and above all, to the specialist, veterinary sanitarian, the meat inspector.

* * *

ACKNOWLEDGMENTS AND NOTICES.—*La Vie Agricole et Rurale* (The Agricultural Life) is a new journal which by its editorial staff and by its contents has rapidly made its way as one of the principal publications in France. The last number is altogether devoted to the horse and equine subjects.

The Cape Province Agricultural Journal for May has an interesting article on the Anglo-Norman horse.

The Agricultural Journal of the Union of South Africa contains the continuation of the article on the anatomy and physiology of the ostrich, by Prof. Duerden, and also from Dr. Theiler, that on facts and theories about "Stijfziekte" and "Lamziekte."

"The Question of Tick Eradication," by Dr. Peter F. Bahnsen of Atlanta, Ga., and "The Diagnosis of Contagious Abortion in Cattle by Means of the Complement Fixation Test," by F. B. Hadley and B. A. Beach, of the University of Wisconsin, have also been received.

A. L.

MEMBERSHIP'S LOYALTY—A. V. M. A.'S STRENGTH.

The forty-ninth annual meeting of the American Veterinary Medical Association goes down into history as the most successful congress yet held by that organization. The fact that its

power for good is constantly being more strongly felt, and that its growth is not merely in numerical strength, marks true progress, and presages a steady and enduring uplift for the American veterinary profession through its powerful and wholesome influences. This strength, out of proportion, it might almost be said, to its membership, is due to the harmonious manner in which its members support its constitution and labor faithfully both as individuals and as a whole, for the accomplishment of the high ideals upon which the association has focused its aim.

This good-fellowship is indigenous to the organization; it has grown up with it and becomes more and more inseparable from it as time goes on. Little ripples appear on the surface at times, but they do not even vibrate the great body of the majestic ship as it continues on its straight and determined course. This fact was borne in upon the members, in the manner in which the administration was supported at the recent meeting, despite dissenting sentiments that had been disseminated during the past year.

Loyalty to the cause has always been an inspiring feature that has characterized the work of members and officers alike in this organization of professional men; and that in itself is sufficient to hold them together and to give to the association the dignity and strength it has displayed in the regulation of veterinary educational institutions, and the influence it has exerted upon the ethical standing of the members of the veterinary profession of America.

We have just emerged from one of the most successful meetings in the history of the association, a meeting the character of which was in many respects unlike any former gatherings, and we are entering upon the work of preparing for the next convention of this mighty organization, of which the character will again be different from the last, and it will require the united effort of every individual member to carry it to the successful issue that the occasion merits. It is an occasion that must prompt an inspiration in the heart of every member, and make him feel like grasping the hand of the chief executive and assuring him

of his hearty co-operation in the great work that the association has made him responsible for in electing him its president. With that spirit in the hearts of the members, and the excellent staff of officers elected to the various positions of responsibility, the preparation for the golden anniversary of the American Veterinary Medical Association has begun under the most favorable auspices, and the success of the occasion is assured.

THE KANSAS "HORSE PLAGUE."

Up to the time of this writing we are not in possession of any authoritative report *direct* from any of the veterinarians or other scientists on the ground as to what the terrible "plague" that has attacked the horses of Kansas and is killing them by the thousands, actually is; although indirect reports seem to indicate pretty clearly that it is of miasmatic origin, and is either "Forage Poisoning," "Cerebro-Spinal Meningitis," or "Borna Sickness," the gross symptoms of which simulate each other in a more or less degree. If it is the first named condition, we shall soon have reports to that effect, as the symptoms and pathology are familiar to American veterinarians, while the last one, so far as we have been able to learn, has not, up to the present, been recognized in this country.

It is described by Friedberger and Fröhner as a miasmatic infective disease, in which the contagium is not conveyed from one animal to another, but is taken up with the fodder and drinking water. It differs from cerebro-spinal meningitis, in that there is no inflammatory changes. It appears with greatest frequency in well fed horses. This malady has long been known in the kingdom of Saxony as an epizootic disease (*Borna, Zwickenu, Plauen, Oelsnitz, Chemnitz*). We feel quite confident, however, that in the very near future, possibly before the last page of this number is printed, that the combined efforts and scientific knowledge of the veterinarians and other scientific workers from the Kansas Agricultural College and from the Bureau of Animal Industry of the United States Department of

Agriculture, working in co-operation with the state veterinarians and private practitioners, will not only result in a positive diagnosis of the disease, but also in a solution of its control, in a manner characteristic of American expedition. That the condition is a terrible one, we are well aware, but we believe that in the light of present-day knowledge, serumtherapy will proclaim another victory, both therapeutic and prophylactic, as soon as the pathology of the disease has been determined; and that in the meantime, the horse owners of Kansas and Nebraska will soon witness the checking of this scourge that is fast depleting their horse stock, through sanitary, and other preventive measures.

[*Addendum.*] Since the above was put in type, we have received advices from the Bureau of Animal Industry of the United States Department of Agriculture, to the effect, that judging from the symptoms and post mortem lesions reported by the government veterinarians who are investigating the horse disease in Kansas and Nebraska, the affection is forage poisoning or so-called cerebro-spinal meningitis. As a result of these reports from the veterinarians in the field, the "Bureau" has sent out a *circular letter, dealing with the cause of the disease, how it may be recognized and how it may be prevented and treated; the immediate result of which, has been a checking of the disease where instructions as to change of feed have been followed. In the meantime, a complete investigation of the affection is being made, looking to the isolation of a specific organism or virus as the causative factor.

THE ACTUAL REGISTRATION AT INDIANAPOLIS was 797, being made up as follows: Members 341, visitors (most of whom afterward became members) 277, ladies 179; but this figure of practically 800 registered, does not represent the actual number in attendance, as it is known that a large number of all three classes did not avail themselves of the registration privilege, and therefore the local committee was unable to account for them.

* Published on page 128 of this issue.

ORIGINAL ARTICLES.

HOG CHOLERA SERUM WORK—WITH ESPECIAL REFERENCE TO DISAPPOINTMENTS.*

BY M. H. REYNOLDS, ST. PAUL, MINN.

I believe it quite safe to say that Dorset-Niles serum, produced and tested according to standard and accepted methods, in proper dose and properly administered, is an established thing in veterinary medicine; that good serum properly used does give a practical protection from cholera.

Abundance of statistics published by reliable men in widely separated portions of the country with different strains of hogs under all possible differing conditions of feed and care, seem to justify this statement.

Our experience in Minnesota has evidently been about the same as that of cholera workers in other states—not invariably pleasant, and our results are not by any means invariably ideal. We meet strange experiences in this work, *e. g.*, the same lot of tested serum and virus sent to two different men at about the same time, in different portions of the state, seems to give surprisingly different accounts of itself in actual use. One veterinarian treats by the serum-virus method nearly a thousand healthy hogs for one man with less than two per cent. loss; the other man loses 76 per cent. of a treated herd.

It is our constant policy to tell owners frankly that on a large average results by the serum-virus method are quite satisfactory and the loss small. We tell them the average loss is small, as compared with possible heavy losses from susceptible hogs in a cholera neighborhood; but we always go a little farther and tell the owner that in occasional cases, fortunately rare, the loss in an individual herd may be very heavy. We give him freely any in-

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formation he wants and then leave him to operate on his own judgment.

Explanations for disappointments are usually not difficult to find if one can get full information concerning the production, test, and use of serum. In many cases unsatisfactory results follow when the use of serum has been *delayed* until the herd is generally infected. In such case the serum frequently serves to check the disease for a short time, but subsequent losses may be heavy.

Bad results are liable to follow careless handling of the serum, particularly in case of bacterial contamination. A good serum may be shipped from the producing plant and be then kept for days or weeks in a warm express office or in a warm office until it has undergone objectionable changes.

Severe losses may be due to the use of poor, untested serum which should never have been sent out. We can only be sure of potency by careful production and conscientious test.

Impotent serum in case of an outbreak may serve no useful purpose in checking the disease and the herd be worse for its use simply because of handling sick hogs. Infected hogs frequently die sooner after the catching and handling necessary for treatment than would have been the case had they been left alone. In such case death occasionally occurs within a few hours after the handling. Such losses would occur just the same whether the hogs were treated with serum or rain water, and would usually occur a few days later even without the handling; but the owner looks with grave suspicion on any such explanation.

Or good, fresh serum may be handled and used by a careless or incompetent man in such a way as to give disastrous results when the trouble is all due to unclean surgical procedure.

A year or so ago I had the opportunity to visit a large herd, fortunately in a neighboring state, where our serum had been used and unsatisfactory results reported. At the time I saw this herd, the hogs—nearly all of them light shot—were divided into three lots. The first lot of 45 had done well; there was apparently nothing wrong with them, with the exception of an oc-

casional small swelling at the point of treatment. The second lot of about the same size were unthrifty, some of the pigs were evidently badly out of condition; quite a number of them had marked swellings. The third lot was the most unthrifty—the worst looking lot of hogs I have ever seen. Practically every pig had a large swelling and quite a number had died. These three groups had been treated in the order as described. The work was done by a graduate veterinarian and the same serum was used throughout. I was unable to see the veterinarian. The manager of this farm, a very intelligent man, was present only during the treatment of the first lot and thought that the operator had been reasonably thorough in his surgical cleanliness. After the first lot was treated the manager went into another department and saw no more of the work. Information from other sources indicated that the operator had started out with clean instruments and had been careful in his skin disinfection, etc., and had grown progressively more careless and indifferent with each lot treated.

About two years ago two young veterinarians, both well trained, treated by the serum-virus method about 320 hogs in 300 minutes. These belonged to a city garbage feeder whose pens and yards were in the usual condition as we see it at these places. Some 50 pigs were lost out of the 320, to the owner's great dissatisfaction. A careful study of this interesting experience showed that the first lot treated numbered 45. These had been kept in a clean pen and fed cooked garbage. There had been no loss in this group and no unpleasant results of any kind. The remaining 275 pigs were taken from filthy yards, given treatment and put back into filthy yards. The same serum was used throughout, and further, this same serum was used about the same time on our University farm with the best of results. In addition to this, we have evidence of a very satisfactory serum test for this lot of serum. Autopsies at the garbage feeder's place showed that some of the deaths had occurred as the result of septicemia, there was evidence that some had died from garbage poison, a few had evidently died from inoculation cholera. The

larger portion of the loss was probably due to septic infection. Here we have one lot of serum giving first, a good test; second, satisfactory results when used in a careful way under favorable conditions on the University farm, and in the first lot of pigs treated for the garbage feeder. Later on the two young men were apparently getting tired and in a great hurry to finish.

In another instance we sent serum to two different veterinarians at about the same time. One man treated about 1,000 hogs for one man, using the serum-virus method, with less than 2 per cent. loss. The other veterinarian treated a small farm herd and lost, plainly from inoculation cholera, something over 79 per cent. of the herd, the same serum and the same virus being used in each case.

Where hogs apparently well at the time of vaccination sicken with cholera in about two weeks, the trouble is due to the mistake of using poor serum with standard doses of virus or an insufficient dose of good serum with a standard dose of virus. The herd merely develops cholera in two or three weeks in spite of insufficient or impotent serum.

Some disappointments—possibly more than we have supposed—are due to the use of contaminated virus.

Losses may occur as a result of careless work on the part of the veterinarian. A man may be careless about giving proper doses. He may attempt to economize by using smaller than the directed doses of serum. In other words, a man may be incompetent or careless in this work, just the same as in any other line of work.

Unsatisfactory results come most frequently perhaps in the cases of farmers who wait too long.

Dissatisfaction for which the farmer himself is to blame comes when the farmer insists on treatment by the "serum-only" method of healthy, unexposed hogs after it has been explained to him, as every conscientious veterinarian must do, that "serum-only" treatment with healthy, unexposed hogs gives but very temporary protection.

It should be made evident to owners and veterinarians just as

soon as possible that anti-hog cholera serum is not something which anybody and everybody can use blindly and have good results.

I should like to start some discussion of the general questions as to who should be permitted to use hog cholera serum. We have settled on a clearly defined policy which we are following very closely. Perhaps ours is not a wise policy. This may be a debatable question, particularly in western sections, where veterinarians are not so plentiful and where there are large stretches of country with plenty of hogs and serious hog cholera possibilities and few veterinarians.

GENERAL POLICIES.

It seems to me there is opportunity for discussion as to the best methods of distribution of serum, especially serum produced by a state institution. In some states serum is produced under state appropriations and distributed gratis to practically anybody who asks for it and to be used by anybody who may be able to get a syringe. Other state institutions have their work started by state appropriations and are maintaining it from the sale of serum, believing that this is a much more efficient method of distributing than the other. As a basis of discussion on this point I will present our Minnesota method, not insisting at all that it is the correct method or the best available by any means. Our serum is produced by the State Agricultural Experiment Station. It was started by direct appropriations from the Legislature, for buildings, equipment, etc., and for research work. The routine serum production has since been supported by sales of serum. Our serum is sent out exclusively by express C. O. D. either to owners or veterinarians, but only for use by well-trained veterinarians so far as we are able to know and control. During the present year we have restricted still further our distribution of serum for the serum-virus method, limiting it to veterinarians in state employ; *i. e.*, either sanitary board or station. This has been a difficult and embarrassing question for us. There are good arguments for and serious objections to this particular

portion of our policy. There are of course plenty of well-trained veterinarians, careful men, to whom we would gladly send serum and virus if we were able to discriminate. But a serum producing plant in a state institution like ours can not discriminate in any such way. If we send serum to be used with virus by careful and competent Dr. A we must also send it to Dr. B who may be very careless and unsafe in his surgical method and not the man to be trusted with an agent with such possibilities of harm as virulent hog cholera serum. We adopted this policy only after careful consideration at a joint meeting of experiment station and sanitary board veterinarians. We realized at the time that we were on debatable ground, but the weight of reason seemed to be distinctly in favor of the method adopted.

Bad results following use of serum which had stood perfect test; serum which had been used among University Farm hogs with results that were entirely satisfactory and used with good results by other practitioners in the state have seemed to force us into this position. On the other hand there may be many farmers having healthy herds in hog cholera neighborhoods. These farmers may be willing and even anxious to immunize their hogs and there may be no state man available for serum-virus work. Serum-only treatment for these healthy unexposed herds gives immunity that is evidently too brief to be practical and leads to useless expense and dissatisfaction in case of subsequent failure to protect.

Such farmers who should have opportunity to have their hogs permanently protected are liable at any time to be deprived of that opportunity. If we refuse to send serum to an incompetent non-graduate, there comes a fine opportunity for owners in general and friends of the non-graduate in particular to cry unfair discrimination, jobbery, graft. If the untrained veterinarian is the only man available within a long distance and the state is unable to send a man, then farmers are not able to get even serum-only immunity for their hogs.

The pros and cons of discussion on this point could be drawn out at very great length, but I trust that this will be sufficient

to start a discussion that may clear the atmosphere and show who is right. Our station sends serum for use by trained veterinarians only. Authorities in other states send it indiscriminately to any one who asks for it and has the price. Who is right? May one policy be right and best in one state and a reversal of this be best in another?

Our general method of distribution is given fully in our Hog Cholera Serum Treatment Agreement which is signed by the owner and attendant veterinarian and another circular "Conditions for Distribution of Hog Cholera Serum," both of which are here submitted and read as follows:

"HOG CHOLERA SERUM AGREEMENT.

"The Veterinary Division of the Minnesota Agricultural Experiment Station does not guarantee the protection of hogs against hog cholera or any other diseases. Inasmuch as the vaccine is produced as an accommodation to owners the Institution assumes no responsibility in vaccination, excepting as to care in preparing, testing, and distributing the serum.

"Figures showing actual results of several years' work are freely given to owners, who must then decide for themselves and assume their own responsibility for vaccination. We are glad to advise as to method, time, etc.

"Excepting in cases which plainly call for unusual action, serum will not be furnished for the serum-virus (simultaneous vaccination method) except by veterinarians in state employ.

"Owners must understand that the serum-virus or double vaccination carries some risk, which, on a large average, is small when tested serum is used in full dose carefully administered and with proper dose of virus. In an occasional herd the loss may be considerable.

"The use of 'serum-only' is safe, but should be restricted to recently infected herds and to hogs that will be given plenty of pen exposure at the time or very soon after treatment with serum. We do not under ordinary circumstances advise 'serum-only' treatment of unexposed hogs, because the duration of protection thus given is usually short. After a few weeks such hogs may take the disease and die.

"This Institution assumes no responsibility beyond care in production, testing, and distribution of serum.

"Anyone wishing hogs treated with Station serum must agree to these conditions and sign this statement.

"Signed.....
"Date.....

"Place.....
"Countersigned by the veterinarian treating the hogs.
"Signed....."

"CONDITIONS FOR DISTRIBUTION OF HOG CHOLERA VACCINE.

"Injections to be made in the axilla or on the inner and upper portion of the thigh, not in the groin.

"Serum may be sent only by express C. O. D., or for cash in advance, for use by responsible veterinarians, on healthy hogs, in the early history of outbreaks. Serum cannot be accepted for credit on being returned. An order must constitute a sale under all ordinary conditions.

"Veterinarians must agree to not use serum where the disease has prevailed for some time and the herd is already badly infected.

"The serum must be used in *full dose as directed*. Give full dose or none at all. Keep serum cool.

"A report of vaccination must be made and signed. Blanks for such reports will be furnished.

"No vaccination should be done until the owner has first signed the blank (to be furnished), stating that he understands conditions and assumes responsibility. This (owner's blank) is to be returned, together with the vaccination report to University Farm, Saint Paul, Minn."

Our schedule of doses is as follows, given in full on every bottle of serum sent out.

Standard Dose of Serum.

Up to 20 pounds.....	10 c.c.	100 to 150 pounds.....	30 c.c.
20 to 50 pounds.....	15 c.c.	150 to 200 pounds.....	35 c.c.
50 to 75 pounds.....	20 c.c.	Over 200 pounds.....	40 to 60 c.c.
75 to 100 pounds.....	25 c.c.		

"In herds where cholera has made its appearance increase these doses 50 per cent.; and for simultaneous treatment with virus for permanent immunity, the above serum dose should be doubled.

Virus Dose.

Up to 20 pounds.....	0.5 c.c.	100 to 200 pounds.....	1.5 c.c.
20 to 100 pounds.....	1 c.c.	Over 200 pounds.....	2 c.c.

Experience has taught us that the margin between serum test dose and the dose to be given in field work should be very wide. In brief our plan for testing serum is to mix all bleedings from a given hyperimmune and use two test pigs for each such mixture; *i. e.*, two test pigs for each hyper. Each receives full dose of tested virus. One test pig receives 75 per cent. of serum-only dose previously mentioned. The other pig receives full serum-only dose for weight. We ask our serum to protect in the three-quarter serum-only dose. This is practically our test dose. Up to date we have been directing that for field work serum-virus method serum should be administered in dose equal to one and one-half times the serum-only dose for weight; *i. e.*, 50 per cent. increase over serum-only dose or double the three-quarter dose which we require shall fully protect the test pig before the serum is labelled potent. We are now getting out a new dose label and our advice for serum-virus method is use double the serum-only dose instead of one and one-half times the serum-only dose. For use in sick herds we advise an increase of 50 per cent. over the standard serum-only dose.

NEEDED INFORMATION.

Those of us who have been in the hog cholera serum work for several years are in a position to appreciate painfully at times the fact that there are many important problems still to be worked out. We need more information concerning conditions affecting potency of serum; information; *e. g.*, concerning the effect of light, heat, presence of red blood cells, stronger preservative, etc. We would like very much to know just what part, if it has any, *B. cholera suis* plays in the etiology of hog cholera and in the efficiency of our serum. We need very much a laboratory test for potency. If some one would only work out a reliable laboratory test for potency of serum, he would have the immediate gratitude of all serum workers. Such a test would greatly economize time and expense of producing and do away with the uncertainties and variabilities of individual pigs used for serum test purposes.

ECONOMY OF PRODUCTION.

It would be very desirable, indeed, if we could greatly reduce cost of production. Formerly we used pigs raised and selected for us by several breeders with whom we have special arrangements. This has given us the color, type and weight that we prefer. It has given us pigs from dams that were quite certainly susceptible, etc., but it has been expensive. In our later work we have economized very considerably by using stock yards' pigs as virus producers, but continuing the especially selected pigs for test purposes. This gives us virus pigs at about one-half of what we have been previously paying.

There is a great waste and one which would seem to be unnecessary in the common failure to utilize the carcasses of virus producers. Some serum plants are rendering virus producers and making tankage, but I think not many. We have found that these carcasses can be quite easily cooked by steam so that they may be crushed and mixed with meal feed. Our hyperimmunes and other hogs were extremely fond of the mixture and it is presumably an extremely good feed for hyperimmunes. How-

ever, there appeared a difficulty which we have not yet overcome, that of stinking troughs in warm weather. If hogs could be so carefully fed that they would clean out their troughs thoroughly and these troughs could then be sunned and dried or possibly washed out in warm weather, it would seem that this difficulty could be overcome.

Dr. A. C. ARMSTRONG, of New York City, died at the French Hospital, that city, as a result of blood poisoning, on Tuesday, September 24. The doctor had not been well for some time, and entered the hospital for treatment a week prior to his death.

PROTECTIVE VACCINES is the caption of an article in the Baton Rouge, La., *Country Review*, by our esteemed collaborator, Dr. W. H. Dalrymple, in which he sets forth the dangers resulting from relying *completely* upon these agents for the control and eradication of diseases, and losing sight of the great necessity of sanitation in connection with their use. He cites an example of this oversight in the following paragraph:

"When an outbreak of charbon or hog cholera takes place among a farmer's stock, he loses no time in his effort to secure anthrax vaccine, or hog cholera serum, as the case may be, which, necessarily, is the proper thing to do. But what does he often do with the carcasses of the animals that, unfortunately, succumb to one or the other, or both, of these diseases? The chances are, he may haul them off to some convenient spot where buzzards, or other carrion feeders, can feast from off their germ-seething bodies and carry the infection far and wide. Or, he may dump them into some running stream so that his neighbors below may get a 'dose of the same medicine' among their stock. We do not mean to presume, of course, that he intends it this way; but, nevertheless, infection is often spread in just such manner."

After a full and interesting discussion of the subject, the doctor concludes his article by saying:

"By all means protect the living animals, but don't forget that the dead ones, and their surroundings, are what furnish much of the 'seed' for future infection."

It is these articles written directly to the animal owners that do so much toward building up the defenses and broadening the scope of sanitary science.

USE OF THE FERMENTATION TEST IN DAIRY INSPECTION.*

By L. A. KLEIN and H. C. CAMPBELL, UNIVERSITY OF PENNSYLVANIA.

The different species of bacteria most commonly found in milk may be grouped according to the character of curd they produce when the milk is kept at a temperature of 37° to 38° C. Organisms that ferment the milk sugar and form lactic acid produce a solid, homogeneous, jelly-like curd, with little or no fluid. Another group of species, including the bacilli of the subtilis and mesentericus group, produce a rennet-like ferment that coagulates the casein and a proteolytic ferment that digests or peptonizes it. The different species in this group produce the two ferments in varying proportions. When the rennet-like ferment predominates the curd is hard, contracted, in one or several pieces, floating or suspended in more or less fluid, which is almost entirely clear but may have a greenish or whitish tinge; it is slowly digested. When the proteolytic ferment is dominant then the curd is soft, flocculent and "mushy" or coagulation does not occur at all, but peptonization is rapid. These are the so-called "cheesy" or "peptonized" curds. The staphylococcus pyogenes and the bacilli of the proteus group also produce a "peptonized" curd.¹ The bacteria of the coli-areogenes group produce a jelly-like curd, permeated more or less with gas bubbles, in one or more pieces, floating or suspended in a turbid fluid, which may also exhibit collections of gas bubbles. A "flaky" or granular curd, associated with fluid that is turbid and may be whitish, yellowish or otherwise discolored, is produced by a species of yeast that ferments lactose.

Species representing all of these groups will be found in any sample of milk. The time of curdling will depend upon the number of bacteria in the milk and the temperature at which

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it is kept, but when the milk is kept at a temperature of 37° to 38° C., the kind of bacteria present in greatest proportion will determine the type of the curd, except when the milk is very rich in bacteria. Then, according to O. Jensen, the lactic acid forming organisms are so numerous that they suppress the other species and a jelly-like curd is usually formed. The character of the curd can therefore be taken as a criterion of the bacteriological properties of the milk under examination, and, furthermore, as indicating the variety of fermentation or decomposition the milk will undergo with age.

Upon these principles was founded the fermentation test. This test, first proposed by Prof. J. Walter, of Switzerland, and subsequently improved by A. Peter and others, has been in use for years in cheese factories to detect milk unsuitable for cheese-making.

It is very simple and does not require any special apparatus. In cheese factories large test tubes or bottles holding from 120 to 140 c.c. or smaller test tubes of 40 to 50 c.c. capacity are used for the milk samples. They are closed with a rubber stopper and are held at the required temperature in a water bath. In our work we have used test tubes of 50 c.c. capacity closed with a cotton plug in the usual manner for bacteriological work. This size tube is to be preferred to that usually used for bacteriological cultures because with the greater quantity of milk that can be placed in the larger tube the test is more reliable and the result is easier determined.² We have also used an ordinary incubator in place of a water bath.

The test tubes are washed and cleansed in the usual manner, plugged with cotton and sterilized by heating in a hot air sterilizer for 2½ hours at a temperature between 150° and 160° C. It is quite important that the tubes are sterile, as any organisms in the tube would develop in the milk and might influence the result. The tubes are numbered with a paraffine pencil to correspond with the sample of milk and are then filled to within a finger's breadth of the bottom of the cotton plug, closed with the cotton plug and placed in the incubator. In transferring the

sample of milk from the vessel in which it was collected to the test tube the necessary precautions should be taken to prevent contamination.

Twelve hours after being placed in the incubator the samples are examined. If the milk was fresh and normal there will be no change apparent except perhaps a clean, sour odor. "When the cream layer is bulged upward, or there is a greenish layer beneath it, this is an indication of the beginning of fermentation or curdling."³ If there is no change at this time, then the samples are to be replaced in the incubator and observed again in 12 hours, and subsequently at 12-hour periods, if necessary. When curdling does not occur after 12 hours then the reaction of the milk should be taken and preservatives tested for. If the milk is curdled then the character of the curd is to be noted. As was first pointed out by A. Peter,⁴ the various curds may be classified into five types or classes, with three degrees or variations for each type. He also proposed a system of symbols or abbreviations to be used in recording the results of tests. This classification and the symbols have been followed by us in the main.

The types of curd and the symbols by which they are recorded are as follows:

1. *Jelly-like Curd.* J.₁—Solid, smooth, white, jelly-like curd, with no fluid. J.₂—Curd same but showing very few furrows or gas holes. J.₃—Curd presents furrows, gas holes or cracks, with some fluid.

This type of curd indicates that the lactic acid forming bacteria predominate, and if it is present at the twelfth hour or before indicates that the original contamination with this species was excessive or that the milk was old. According to O. Jensen, however, milk very rich in bacteria will always give this type of curd because in such milk the lactic acid formers are as a rule present in such large numbers that they repress the other species.

2. *Peptonized Curd.* The curd may be hard, contracted and in one or several irregular pieces or soft, flocculent and mushy, with more or less fluid that is entirely clear but may have a

greenish or whitish tinge. P.₁—The amount of fluid is small in proportion to size of curd. P.₂—Increased amount of fluid. P.₃—Amount of fluid large in proportion to the size of the curd.

3. *Gaseous Curd*. A white, jelly-like curd, showing small holes due to gas formation and in the higher degree presenting a sponge-like appearance; may be torn and a portion driven to the top; more or less fluid present, which may also show collections of gas bubbles. G.₁—Gas holes in the cream layer or in the curd. G.₂—Gas holes numerous in the cream and curd; gas bubbles may also be present in the fluid. G.₃—Curd sponge-like, containing many gas holes; may be split and a portion driven to the top; gas bubbles in fluid.

4. "*Flaky*" or *Flocculent Curd*. Curd in flakes, associated with a turbid fluid, which may be whitish, yellowish or otherwise discolored. Flc.₁—Curd in fine flakes or partially homogeneous. Flc.₂—Large flakes and considerable fluid. Flc.₃—Large flakes, torn, with white or discolored fluid.

Comparison of the sources of the several species of bacteria usually present in milk with the groups of species producing the different types of curd showed a striking parallel between the individual sources and the several types of curds. The lactic acid forming organisms which produce the jelly-like curd are found in greatest abundance in the milk vessels and apparatus. Of the peptonizing bacteria, the species most common in milk are those which inhabit the soil and which are brought into the stable in the dust on the dry fodder and straw and disseminated in the air of the stable when the fodder and straw is distributed. When a cow lies down upon dusty straw or upon a dusty place at pasture some of these organisms may also get into the folds and creases of the skin of the flanks and udder. The gas-forming organisms of the coli-*areogenes* group are normal inhabitants of the intestinal tract and are eliminated with the feces.

In view of these facts we decided to use the fermentation test in our regular dairy inspection work to determine its value as a means of detecting the principal source of bacterial contamination. Many regulations for milk control fix a maximum

limit for bacteria and when this limit is exceeded the dairyman is merely notified or an inspector is sent to the farm to endeavor to discover the cause. A test that will point out the principal source of contamination in such cases would be of great assistance in improving the condition.

In our work the method of counting bacteria, approved by the American Public Health Association, is one of the routine tests, but in order to obtain as much material as possible we did not confine our investigations in connection with the fermentation test to those instances in which the bacterial standard had been exceeded, but made an inspection at the farm whenever the result of the fermentation test seemed to make it desirable for our purpose. The result of the laboratory tests and farm inspections are given below:

Milk from Dairy Farm No. 1—Fermentation test: Gaseous curd showing some peptonization at the twelfth hour. Number of bacteria per c.c., 59,200.

On a visit to this farm it was found that the cows were standing in two rows, facing outward, with less than four feet space between the posterior ends of the animals. Almost every cow, in switching her tail, would strike the cow opposite her in the other row. When urine or soft manure was voided by a cow in one row it splashed upon the rear parts of the cow opposite in the other row and presumably, also, upon the milker and into the milk bucket if they happened to be present at the time. Midway along the length of the rows of cows, and in the middle of the alley between the two rows, an iron rod 4 feet long and bent at the lower end to form a hook, was attached by the opposite end to the ceiling in such a manner as to permit it to be let down when desired. One of the stable men said this was used to hang the filled milk pails on until they could be carried out of the stable to the milk room, but at the time of the visit three filled milk pails were standing on the floor of the alley between the cows. It was in June and the cows were very busy switching at flies, and the feces were soft and abundant. The conditions certainly favored fecal contamination of the milk.

Dairy Farm No. 2—The dealer receiving the milk from this farm has bacterial counts made in his own establishment. From September to December the counts ran from 4,000,000 to 1,000,000, and the dealer requested an investigation. A sample of milk from the herd was examined in our laboratory in the latter part of December, with the following results: Fermentation test, J.₂, P.₁. Number of bacteria per c.c., 22,800.

Inspection at the farm showed that the cows and stable were kept only fairly clean. It was also learned that the dry fodder was fed before milking and that straw was used for bedding. The milking was done with machines, but the last milk had to be removed by hand. During the milking of a cow it was not uncommon for one of the teat cups to fall off into the litter, the sucking action being continued while it lay there. In several instances it was also observed that soiled hairs on the udder had been drawn down into the mouth of the teat cup. The result of the curd test having indicated the predominance of the lactic acid forming bacteria, especial attention was given to the condition of the milk vessels and apparatus and the methods of cleaning them. Small particles of coagulated milk were found on the inner surface of the buckets of the milking machines. The interior of the tubes and cups of the machines could not be examined, but there was good reason to believe that a similar condition existed there. After each milking, it was the custom to wash the tubes and cups with hot water from the boiler in the milk room and then place them in lime water until the next milking. The buckets were also washed with hot water. The dairyman was advised to rinse out the apparatus and buckets with cold water before washing with hot water, and also to feed the dry fodder after milking. There was no further complaint from the dealer regarding the milk. The conditions found confirmed the result of the fermentation test.

Milk from Dairy Farm No. 3—Fermentation test, G.₂, P.₁. Number of bacteria per c.c., 4,740.

Inquiry developed that the men were late in getting to the barn in the morning and the stable and cows were not cleaned

a sufficient time before milking to permit the dust to settle. This was in agreement with the indication of the fermentation test.

Milk from Dairy Farm No. 4—Three samples of milk from this farm were examined at intervals of one week, with the following results:

First sample: Fermentation test, P.₃, G.₂. Number bacteria per c.c., 9,300, including many colonies of staphylococci.

Second sample: Fermentation test, P.₂, G.₁. Number bacteria per c.c., 25,800, including many colonies of staphylococci.

Third sample: Fermentation test, P.₁, G.₂. Number bacteria per c.c., 2,400.

The farm was visited two days after the last sample was examined. It was learned that at the time the milk represented by the first sample was produced there were three cows in the milking line with a vaginal discharge, the result of a retained placenta. At about the same time some excessively acid ensilage was reached in the silo, and when this was fed to the cows it made many of them "scour," several so badly that they had to be treated for diarrhoea. This condition continued for some time. On the day of the visit no cows were scouring, but the stable still showed some evidence of the condition that had existed. There was also one cow with a slight vaginal discharge—one of the three before referred to.

Staphylococci produce a peptonized curd and it is probable that they were largely responsible for the peptonization shown in these tests, the milk being contaminated with the vaginal discharge. The loose condition of the bowels would favor the contamination of the milk with the coli and aerogenes species. The indications of the fermentation test can be regarded, therefore, as confirmed.

Milk from Dairy Farm No. 5—Fermentation test, G.₁, P.₁. Number of bacteria per c.c., 361,400. Numerous colonies of streptococci on plates.

When the farm was inspected the cows and stables were found to be soiled with manure. There were thirty-nine cows being milked and only one man to clean the stable and the cows,

although he had the assistance of another man to milk. Three cows had alterations indicating catarrhal mastitis in the udder. The milk of one contained streptococci and leucocytes in large number, and in the milk of another numerous leucocytes were found. Neither streptococci nor an abnormal number of leucocytes were found in the milk of the other one.

The condition of the stable and cows corresponded with the result of the fermentation test.

Milk from Dairy Farm No. 6—Fermentation test, J.₂, P.₁. Number of bacteria per c.c., 179,000. The number of bacteria per c.c. in the milk from this farm had been running below 10,000 for more than a year and an investigation was therefore made to discover the cause of an increase. It was learned that during the colder parts of the year it is the custom at this place to store the milk over night in the milk house without ice, after it had run over the cooler and been bottled. In warm weather the milk is iced after being bottled. At the time the milk tested was bottled the weather turned suddenly warm in the evening but no ice was used. After that day the milk was iced and the bacterial count returned to the usual number. No condition in the stable or in the cows and no defect in methods was discovered that would increase the bacteria in the milk.

The condition on the farm therefore confirmed the fermentation test.

Milk from Dairy Farm No. 7—Fermentation test, P.₂, J.₁. Number of bacteria per c.c., 34,600. The bacterial content of this milk is usually below 8,000.

On the day the milk was produced from which the sample was taken, hay was being hauled to the barn and put into the loft above the cow stable. The unloading was done at one end of the barn where there were three doors opening into the stable, and was continued during the entire time the cows were milked in the afternoon. On this day the platforms were taken up in about one-half of the stalls in the stable and new ones put in.

The indications of the fermentation test were also confirmed in this case.

CONCLUSIONS.

In all seven investigations the fermentation test proved to be a correct criterion of the principal source of bacterial contamination and was of material assistance in discovering the cause. We are not unmindful of the fact that our cases were rather few in number and that it would be desirable to have a larger number, but we are of the opinion that the results obtained indicate that the fermentation test is likely to prove of great value for the purpose mentioned.

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 2. Barthel, Chr., *Die Methoden zur Untersuchung von Milch und Molkereiprodukten*, Zweite Auflage, p. 120.
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WEDDING FOLLOWS CLOSELY A. V. M. A. CONVENTION.—Dr. Horace Preston Hoskins, St. Paul, Minn., was married September 2, 1912, to Miss Anna Mary Smith, in Christ Church, St. Paul. Dr. Hoskins' friends who met him at Indianapolis little suspected the cause for his unusual happiness during the four days of the convention, which they now realize to have been pleasurable anticipation of meeting his bride after the convention was over. We congratulate the young couple and wish them all the joy and happiness that belong to the nuptial state.

MOTOR TRUCK CAUSES PAINFUL ACCIDENT—We were grieved to read in the New York *World* of September 7 of a painful accident to Mrs. Samuel W. Taylor, wife of the esteemed editor of the *Rider and Driver*. The newspaper report states that Mr. and Mrs. Taylor were in a break driving to the railroad station, at their country home in Stamford, Conn., when a motor truck startled the horse, which was a spirited animal, and caused it to "bolt," and on being pulled up by Mr. Taylor, lashed out with its hind feet, kicking Mrs. Taylor on both legs, shattering the knee cap of one of them. Mr. Taylor was about to start for Syracuse at the time, to manage the New York State Fair.

RADIAL PARALYSIS, AND ITS TREATMENT BY MECHANICAL FIXATION OF KNEE AND ANKLE.*

BY GEORGE H. BERNs, D.V.S., BROOKLYN, N. Y.

Attention was called to this striking and very peculiar form of lameness in horses, by Günther in his *Myologie*, as early as 1866. Möller in 1875 diagnosed it as paralysis of the radial nerve, and later on it was observed, and fully described by Frohner, Hess, Cadiot, Hell, and others. In fact, it is referred to in almost every recently published work on veterinary surgery.

In Dollar's translation of Cadiot's "*Clinical Veterinary Medicine and Surgery*," an entire lecture is devoted to the subject. In it he presented a beautiful clinical picture of the disease and its symptoms, and mentions external violence or mechanical injuries to the radial nerve and the structures it supplies as its chief cause.

Möller, according to Cadiot, divides his cases into three groups, viz.: complete, incomplete, and partial, and the symptoms vary according to the degree and extent of the injury and resulting paralysis.

The symptoms are minutely and most accurately described by Cadiot, and I cannot do better than to use his own words:

"In complete paralysis the joints of the affected limb, with the exception of the shoulder, are usually flexed when the horse is resting. In consequence of loss of power in the triceps and anterior brachial muscles, the arm is extended and straightened on the shoulder, the scapulo-humeral angle is open, and the elbow depressed. The forearm is flexed on the arm by the contraction of the coraco-radialis, while the metacarpus and phalanges are bent by the action of the posterior anti-brachial muscles. The knee is carried in advance, level with, or in front of, a vertical

*Read before the forty-ninth annual meeting of the American Veterinary Medical Association at Indianapolis, August, 1912.

line dropped from the point of the shoulder. The hoof is usually rested on the toe, but when advanced beyond the above mentioned vertical line it may be placed flat on the ground, the joints then being less markedly bent. When the limb as a whole is flexed, it may be brought into normal position by thrusting back the knee with sufficient force to counteract the action of the flexor muscles.

"In walking, the shoulder and arm are more or less 'carried,' the lame limb being moved as a whole; but as the lower portions of the limb are insufficiently extended, the stride is much shortened. The least attempt at placing weight on the leg causes all the joints to become flexed and the shoulder and arm to suddenly drop; the animal, feeling itself falling, instantly transfers weight to the other limb. At a more rapid pace the animal goes on three legs, as though suffering from some exceedingly painful condition.

"Incomplete paralysis may either constitute a stage in recovery from complete paralysis, or an independent condition. At rest the limb is held as in the preceding form, but the entire plantar surface of the hoof more frequently comes in contact with the ground. In moving, lameness is less marked, and instead of occurring at every step may only appear at intervals, varying in length with the degree of paralysis, rapidity of movement, and smooth or rough character of the ground. The limb is slowly advanced, the stride shortened, and the hoof carried or dragged along the ground. The animal stumbles over the smallest obstacle, the limb immediately becoming flexed.

"In partial paralysis most of the muscles supplied by the radial retain their function, and disturbance is much less marked. As a rule, the position of the limb at rest is normal. During movement it is fully extended, the stride is of ordinary length, and the joints do not collapse when weight is placed on the limb. Slight lameness is visible at a trot, the shoulder and arm being more or less markedly carried forward, without, however, rolling outwards, as in paralysis of the suprascapular nerve."

According to European writers, the disease is self-limiting,

and in all cases, except those complicated with fracture of the first rib, the prognosis is comparatively favorable, and no special line of treatment is indicated further than rest in slings in severe cases, massage, cold douches, light blisters, and, when convalescing, gentle exercise on level ground.

While this condition is by no means of frequent occurrence, I venture the opinion that a large number of the gentlemen present have seen cases of it.

When we first began to use an operating table for operations upon the feet, we used the McGee-Hodgson table, which has a very large and perfectly square top, and in order to bring the affected foot within comfortable reach of the operator it was necessary to fasten it close to the front edge of the table, extending it probably twenty-four or thirty-six inches in advance of its fellow, which was secured in a natural vertical position.

In this position all the flexors of the limb, and more particularly the triceps and anterior brachial muscles, were greatly distended, and if our operation were prolonged or the animal struggled a great deal, it frequently happened that he would come off the table suffering from a mild form of radial paralysis. In casting horses with the English hobbles, and keeping them in lateral recumbency for a long time, or horses cast in a stall, and unable to rise without assistance, the same thing would occasionally occur.

We attributed this condition to functional disturbances of the muscles probably from over-distention, or a disturbed circulation from the awkward position of the limb, or prolonged inordinate pressure. We paid but little attention to them, and they all got well in time, varying from a few hours to one or two days. Since our operating table has been altered, and this extension of the limb is no longer practiced, we have no more cases of radial paralysis from table restraint.

In the winter of 1897 and 1898 four severe cases of radial paralysis were brought to my notice.

Case No. 1—A large truck horse, owned by Mr. J. A. P., while backing a heavy load, slipped and fell. When again on

his feet, he was unable to place any weight upon the off front leg. He was carted home in an ambulance and I saw him shortly after the accident, when he showed all the symptoms of an aggravated case of radial paralysis. He was standing in a single stall, and we found it impossible to back him out, for the moment he attempted to place weight upon the affected limb the entire leg would collapse, the elbow dropping to within twelve to eighteen inches of the floor, the body descending, and only by instantaneous shifting of the body weight upon the sound limb would he save himself from falling. He was placed in slings, treated as outlined above, but showed no improvement during the first two months. Then he was fired and blistered over the triceps muscles, which showed marked atrophy. In ten days he began to show a little improvement, was placed in a large box stall, and allowed to lie down. Fortunately he got up without assistance, and he was left alone for the rest of the winter, turned out to pasture in the spring, and finally recovered in seven or eight months.

Case No. 2 was seen in consultation with the late Dr. R. R. Bell, about three weeks after I had placed the J. A. P. horse under treatment.

His case was almost a fac-simile of mine. It was treated with hypodermic injections of strychnine in addition to the local treatment, and I saw him in a pasture field six months later much improved, but still lame.

Case No. 3 was another consultation; call this time with Dr. Elisha Hanshew, on his own driving horse. He slipped and fell, sustained radial paralysis, and was treated for several months and finally disposed of as practically incurable.

Case No. 4 occurred in my own practice. A heavy draft horse, examined by me for soundness in January, 1898, developed a radial paralysis in February as a result of a runaway accident. This, like the preceding three cases, was also an aggravated form of complete paralysis. He was treated for six weeks at the owner's stables without apparent results, and the owner then decided to have him destroyed, but finally consented to have him

sent to our hospital in an ambulance for experimental treatment at our own expense.

Having noticed the dropping of the elbow, and the enormous elongation and stretching of all the muscles situated in the scapulo-humeral angle in all these cases, it occurred to me that some benefit might be derived if these muscles could be placed in a state of rest. With this object in view, and after considerable experimentation, I succeeded in devising the iron knee and ankle brace here illustrated.

I invited Drs. R. R. Bell and Elisha Hanshew to see it tried on Case No. 4, which had arrived and was occupying a large box stall. With great difficulty the horse was brought out upon the operating floor, a distance of probably twenty feet. The entire limb was carefully wrapped in cotton, and a large pack placed in the posterior radial region; the bar shoe with the extension spur was applied, and with the assistance of two strong men, one pulling the knee and the other pushing it in a backward direction, we succeeded in placing the limb in a perpendicular position, slipped the brace into its proper place, and with the aid of a stout strap placed in front of the knee, and over the brace behind the knee buckled tightly, retained the brace in position until it had been securely bandaged to the limb, from the fetlock to the elbow.

The animal immediately seemed to realize the great support and comfort the brace afforded by placing his weight upon the paralyzed limb, and with a little assistance by pulling the leg forward and outward, he soon learned to walk into a single stall, a distance of forty or fifty feet, where a sling was placed under him.

The patient, as well as his brace and bandages, was carefully watched, but as no swelling, restlessness or symptoms of discomfort appeared, he was left undisturbed for eight days, when Drs. Bell and Hanshew were invited to see the brace removed.

The animal was backed out of his stall without any trouble, walked to the operating floor with no assistance, and when the brace was taken off, to our great astonishment and gratification,

he walked a distance of at least ten feet without showing the slightest sign of weakness. The leg then began to tremble and would have probably collapsed if the brace had been left off, but after a good hand rubbing it was re-applied. The following week the brace was removed every second day, the leg massaged, and a little exercise on perfectly level ground allowed. After that the shoe was removed, the brace taken off, and the patient allowed to lie down in a box stall. He was regularly exercised, and two weeks later, four weeks from the date the brace was first applied, he was sent home and did excellent service for his owner for years after.

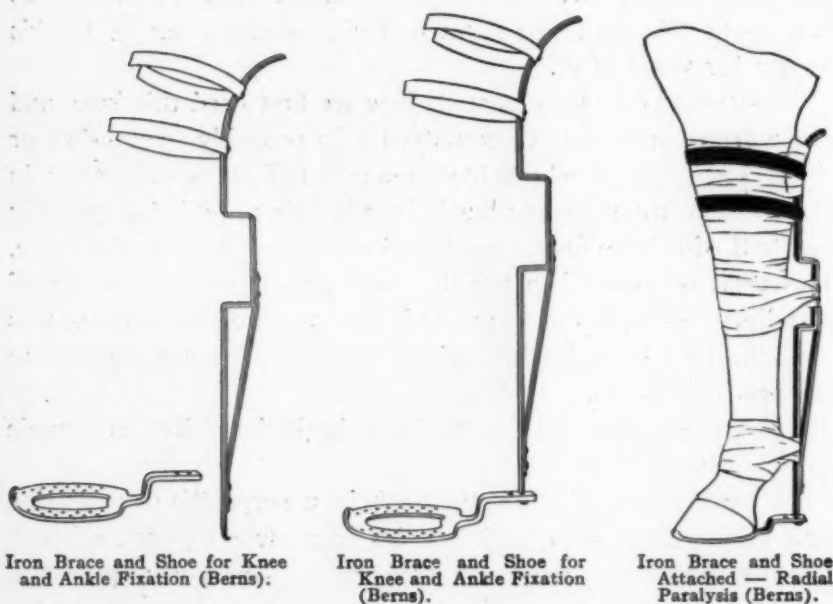
Fourteen years have passed since we first used this knee and ankle brace, and we have employed it in probably twenty-five or thirty cases, all of which have made satisfactory recoveries in from one to three weeks; but it is only fair to add that possibly one-half of this number would have recovered without the brace. However, we made it a rule to use it in all cases of two days' standing. It is also very probable that none of these cases was complicated with a fracture of the first rib or severe injuries to the brachial plexus.

Now a few words as to the brace itself, its object, and mode of application.

It was designed to fix the limb in a perpendicular position and to place the paralyzed muscles in a state of rest, without causing undue pressure upon any part. If properly applied, a space of an inch or more is left between the brace and the leg from the foot all the way to the centre of the forearm, where the brace is slightly curved in a backward direction and rests upon the fleshy bellies of the flexor muscles, which should be well padded with small cushions or pillows made of aseptic wool, and changed frequently during hot weather to prevent maceration of the skin from perspiration.

As the connection between the extension spur of the shoe and the brace proper admits of a limited amount of motion, the patient soon learns to secure comfort by placing the limb in advance of its fellow, partly turning in the toe, resting on the spur

of the shoe, and releasing all pressure from the posterior radial region. Straps and buckles attached to the brace would improve its appearance and probably simplify its application, but fear of severe pressure and troublesome sloughs prompt me to use ordinary roller bandages, which enables me to exert an equal amount of pressure upon the leg from the foot up to and including the forearm, and thus the danger of pressure necrosis is reduced to a minimum.

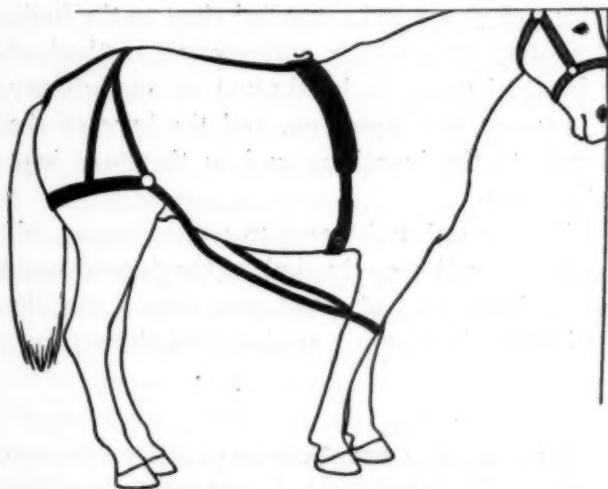


Now, the interesting question arises—Why is this simple treatment so effectual?

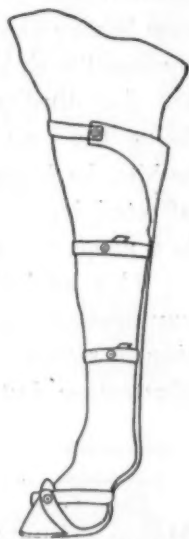
It is a well-established clinical fact that over-distention of muscular tissue produces temporary paralysis. When we consider that the mild forms of radial paralysis above mentioned as having been produced while animals were kept under restraint upon the operating table, with elbow extended but slightly—and the severe cases with the enormous extension and stretching of all the muscles attached to the olecranon and situated in the scapulo-humeral angle, which takes place every time the patient

attempts to place weight upon the affected limb—is it not reasonable to suppose that the very violent and often repeated and continued over-distention of these muscles is largely responsible for this persistent lameness?

I am of the opinion that in the milder forms of this disease the trunk of the radial nerve is rarely involved, and that the symptoms are due to an obstructed circulation from pressure or functional disturbances of the muscles from over-distention. In the severe forms, I have no doubt but that the nerve itself is



Merrillat Method.



Iron Brace Illustrated
in Merrillat's Sur-
gery.

primarily involved, and perhaps from over-distention or pressure due to accidental causes, has temporarily lost its function, producing paralysis of all the muscles it supplies; but I am convinced that the muscles while in a state of complete paralysis are subjected to enormous strains, frequently repeated, which temporarily destroy the contractile power of their fibres and cause persistent paralysis, secondary to and entirely independent of the primary injury to the nerve. Upon this theory the value of the brace as a remedial agent is readily explained.

I also believe that a somewhat similar condition exists in cases of so-called femoral paralysis and dropping of the stifle, following recovered cases of azoturia, and if a brace or some other apparatus could be devised which would keep the stifle in its place and rest the muscles in the anterior femoral region, satisfactory results would probably follow and shorten the period of convalescence.

Dr. Merillat, in describing his treatment of brachial paralysis, evidently recognizes the advantages of mechanically placing the affected limb in a vertical position. He shows a very neat-fitting iron brace, which is made to follow the curves of the leg. It is equipped with buckles and straps and is applied close to the limb. He also illustrates another very simple and original method of fixing the knee in brachial paralysis by the use of an ordinary saddle, back strap, crupper and breeching, and the knee of the affected leg is secured to the breeching and in this way kept in a proper vertical position.

This method looks practical and seems to possess many advantages over a brace, if it will keep the limb in the desired position in severe cases. I have not had a bad case since I saw the illustration, but shall certainly give it a trial at first chance.

DR. GEO. M. WHITAKER DIES SUDDENLY.—Dr. George Mason Whitaker, late of Washington, D. C., an associate editor of *Hoard's Dairyman*, died August 29 after an illness of but a few hours. At the time of his death, Dr. Whitaker was president of the Farmer's National Congress, and secretary of the National Dairy Union. He was for several years attached to the Dairy Division of the Department of Agriculture in Washington. He was a man of unusual culture. For fifteen years he was editor of the *New England Farmer*, and president, secretary, treasurer and trustee of more associations, agricultural boards and clubs than our limited space will permit us to enumerate. He was buried at his old home, Southbridge, Mass., where he was born in 1851. He was active mentally and physically up to the time of his death, and the sudden cutting off of his useful life, was a great wrench to his family and associates.

RESULTS WITH THE COMPLEMENT FIXATION TEST IN THE DIAGNOSIS OF CONTAGIOUS ABORTION OF CATTLE.*

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MADISON.

Since the perfection of the complement fixation test for the diagnosis of syphilis and glanders, many other diseases have been made the subject of investigation by using the blood serum as a basis. Among these, perhaps none has a wider field of usefulness than the application of the test to the diagnosis of contagious or infectious abortion of cattle. This statement is made advisedly and with a full realization that exceptions may be taken. However, when the prevalence of the malady and the great number of animals that are subject to it are considered the above statement has more weight.

Contagious abortion is generally prevalent in all sections where dairying is engaged in, and has caused tremendous losses in certain pure bred herds in which conditions were favorable to the dissemination of the infection.

The disease is most frequently seen in the bovine species. It is caused by a specific microörganism which finds the pregnant uterus a particularly favorable location for growth; and is usually characterized by the expulsion of the fetus before the period of gestation has been completed.

The causal agent is known under various names. Of these *bacillus abortus* (Bang) seems to be the most universally accepted. The organism is a cocco-bacillus 0.8 to 2 microns long by 0.5 to 0.7 wide, stains with aniline dyes, and is Gram negative.

In growing the abortion bacilli blood-serum-agar has been found eminently satisfactory for a nutrient medium. A rarefied atmosphere has given better results than ordinary incubator air. The colonies are small, round, slightly convex, and smooth, simu-

*Read before the American Veterinary Medical Association, Indianapolis, August, 1912.

lating a honey-or-dew-drop. A characteristic bluish cast is observed by transmitted light.

The pregnant uterus is a particularly favorable location for the growth of the abortion bacilli. When present in large numbers they set up an inflammation which is perhaps most noticeable at the cotyledons. Finally the natural exchange of gases and nutrients between the mother and fetus can no longer take place, with the result that abortion or premature expulsion of the fetus occurs.

It does not appear necessary to enter into an exhaustive discussion of contagious abortion from the clinical viewpoint, consequently many interesting points to the practitioner will needs be omitted. Of particular interest may be mentioned the belief that occasionally infected cows may act as carriers of the abortion bacilli for many months after the last abortion, as do the so-called typhoid fever carriers of the human race.

Our work with this diagnostic method as applied to the disease under consideration was started in June, 1911, since which time a large number of animals from different parts of the state of Wisconsin have been tested.

For a full description of the technique of manipulation and components used in the complement fixation test reference may be had to Research Bulletin No. 24 of the Agricultural Experiment Station of the University of Wisconsin by the writers.

The test is strictly a laboratory procedure and is based upon the presence of certain specific antibodies or immune bodies which circulate in the blood of infected animals. These substances vary in quantity and quality, depending upon the period of infection. Their presence is determined by using guinea pig complement, a constituent of fresh blood, as an indicator. If the blood-serum sample under test is from an animal harboring the abortion bacilli a fixation of the complement takes place, leading to a definite and easily recognized test tube reaction. On the other hand, if no infection is present in the animal whose serum is being tested the complement will remain free to act in the dissolution of the red blood corpuscles.

Because it is impracticable in a paper of this kind to take up the different steps in the performance of the test, it will be assumed that most of you are familiar with them. We will therefore immediately proceed to the interpretation of the reaction, which may be summarized as follows:

1. Cattle in which the serum shows a complete fixation of the complement in quantities of 0.01 c.c. and 0.02 c.c. are or have been infected with abortion bacilli

2. Cattle in which the serum gives a complete complement fixation in the quantity of 0.02 c.c. and an incomplete fixation in the 0.01 c.c. amount also are or have been infected with the abortion bacilli.

3. Cattle in the serum of which no binding is noted in the 0.01 c.c. amount and an incomplete binding in the larger amount should be considered questionable reactors and retested after four or five weeks.

4. Cattle in which the serum shows no power of fixing the complement in either amount should be considered free from the infection.

A positive reaction, obtained in testing the serum from a pregnant cow or heifer, does not necessarily mean that the animal will abort. We have shown that abortion is simply incidental to infection. All animals have a certain amount of non-specific physiological resistance, while many members of infected herds show an acquired active immunity which they have gained either from an attack of the disease or by a casual vaccination.

It must be understood that there may be a considerable variation in sera from different sources. In some the antibodies are not present in sufficient quantity to bind the complement, indicating that the animal in question has become infected recently, or that she is just recovering from the infection. In such a case a retest must be made in four to six weeks to determine positively what condition actually exists.

In order that a comparison might be made between the agglutination and the complement fixation tests when used as diagnostic agents for contagious abortion, a series of parallel tests

was carried out as per Table I, a glance at which reveals some discrepancy between the two methods of diagnosis:

Table I. Comparison of the Agglutination and Complement Fixation Tests.

Number of Animal.	Abortion Record.	Agglutination Test.	Complement Fixation Test.
1	Never aborted.....	—	—
2	Never aborted.....	—	—
3	Never aborted.....	—	—
4	Never aborted.....	+	—
5	Never aborted.....	—	—
6	Never aborted.....	—	—
7	Never aborted.....	—	—
8	Never aborted.....	+	—
9	Never aborted.....	—	—
10	Never aborted.....	—	—
11	Never aborted.....	—	—
12	Never aborted.....	—	—
13	Never aborted.....	—	—
14	Never aborted.....	—	—
15	Never aborted.....	—	—
16	Never aborted.....	—	—
17	Never aborted.....	—	—
18	Never aborted.....	—	—
19	Never aborted.....	—	?
20	Never aborted.....	+	+
21	Never aborted.....	—	—
22	Never aborted.....	+	+
23	Never aborted.....	+	+
24	Never aborted.....	—	—
25	Undoubtedly infected	+	+
26	Aborted twin calves.....	—	—
27	Vaccinated heifer.....	+	+
28	Vaccinated heifer.....	+	+
29	Vaccinated heifer.....	+	+
30	Vaccinated heifer.....	+	?
31	Aborted December 21, 1911.....	+	+
32	Aborted August 1, 1911.....	+	+
33	Probably aborted August, 1911.....	?	+
34	Never aborted.....	+	+
35	Aborted May 29, 1911.....	+	+
36	Vaccinated heifer.....	+	+
37	Calf of No. 34.....	+	+
38	Aborted February 19, 1911.....	—	+
39	Bull	?	+

(— sign indicates negative reaction; + sign indicates positive reaction; ? signifies an atypical reaction.)

It is interesting to note No. 26, a young cow that aborted twin calves at the fifth month of gestation. Both tests gave negative results, indicating other cause than infection for the abortion; three months later another complement fixation test also resulted negatively. Nos. 28, 29, 30 and 36 are experimental heifers under process of immunization by vaccination with attenuated cultures of abortion bacilli. They all gave evidence of the presence of the organisms by the tests, although they had never been bred. No. 37 is the calf of No. 34; at the age of 25 days and again at three months its serum showed evidence of the presence

of the specific immune bodies and agglutinins, a point of especial importance when considering the matter of inherited immunity. The dam harbored the abortion bacilli at parturition, as we demonstrated by recovering the organisms from portions of the placental cotyledons. More conclusive evidence was established by preparing, from the growths, an antigen which gave a typical binding when titrated against the serum from a known positive reactor. The bull, No. 39, had been used for service in an infected herd for some time, which accounts for the positive results with his serum.

These and other comparative tests in which clinical history has been much more closely corroborated by the complement binding reaction than by the agglutination test lead us to regard the former as greatly superior to the latter as a diagnostic means for contagious abortion. However, the additional evidence which the agglutination test brings to bear upon suspicious or atypical reactors is usually sufficient so that a definite diagnosis may be made. Accordingly, it is recommended in such cases for use in conjunction with the complement fixation method. When both tests give positive results we are safe in concluding that the animal is or has recently been infected. Other investigators report results which are in accord with the above statements.

Among other things, it is, of course, of utmost importance to know if this new complement fixation test is accurate when applied to the same animal at stated intervals. To establish this point, consecutive tests were made on a herd of infected cattle belonging to the Wisconsin Experiment Station. The animals were of various ages and breeds and were representative of a good dairy herd. The results of these tests are given in Table II, and are interesting, as a number of hitherto undemonstrated and important points relative to this disease are brought out, viz.:

1. The persistence of the immune bodies for more than a year after abortion occurred, *e. g.*, No. 3.
2. The fact that No. 5, a calf, did not show evidence of the immune bodies up to a year old, although she was dropped prematurely and was in constant association with infected animals.

3. Evidence that these bodies appear gradually, indicating that a certain degree of immunity results from infection and that there is a decided probability of artificially increasing the immunity by the administration of vaccines and bacterins.

Table II. Summary of Consecutive Tests in an Infected Herd.

No.	Abortion History	1911 July Test	1911 Oct. Test	1911 Dec. Test	1912 Jan. Test	1912 March Test	1912 April Test	1912 July Test
1	Calves April 29, 1911.....	+	+	—	+	+	—	—
2	Aborted August 1, 1911.....	+	+	+	+	+	+	+
3	Aborted February 19, 1911..	+	+	+	+	+	+	—
4	Aborted May 29, 1911.....	—	—	?	+	+	+	+
5	*Dropped March 10, 1911.....	—	—	—	—	?	—	+
6	Calved February 19, 1912....	—	?	?	+	+	+	+
7	Aborted December 21, 1911..	—	?	+	+	+	+	+
8	Probably aborted August, 1911	+	+	+	+	+	+	—
9	Aborted years ago.....	+	—	+	+	—	—	—
10	Bull	—	—	—	+	+	—	+

*Injected with abortus vaccine in April, May and June, 1912.
(— sign indicates negative reaction; + sign indicates positive reaction; ? denotes atypical reaction.)

The practical value of this new diagnostic method may be best brought out by giving a synopsis of the results obtained in the field. Samples of blood from various herds, whose owners wished to know definitely whether or not the contagious form of abortion existed, have been forwarded to our laboratory for examination. Sometimes full details concerning the history of each animal accompanied the samples. At other times absolutely no information was given. One veterinarian stated that he purposely omitted such assistance so as to avoid the possibility of influencing us by suggestions. When convenient, we have gone into the field ourselves to collect the serum samples, as by so doing we felt that more reliable data could be gathered. We realized that in new work of this nature too much care could not be observed if the results and conclusions were to be of scientific value.

Table III. Summary of Results with the Complement Fixation Test in Infected Herds.*

Abortion History	No. of Animals	Reaction					
		Posi- tive	Nega- tive	Atyp- ical	% Positive	% Negative	% Atypical
No history of abortion.....	350	69	267	14	19.7	76.3	4.0
Known aborters	118	99	17	2	83.9	14.4	1.7
Herd bulls	12	3	9	0	25.0	75.0	0.0
Totals	480	171	293	16	35.6	61.1	3.3

*A very few of these animals came from herds where no infection existed.

Of the 480 animals represented in Table III, 350 had no history of abortion, while 118 were known to have aborted, and the balance were herd bulls. Of the animals in these infected herds 69 or 19.7 per cent. showed evidence of abortion infection, although they had never aborted. Included in this number are certain cows whose history is unknown, and which undoubtedly had aborted some time in the past. But 83.9 per cent. of the cows which had been known to abort gave positive reactions. This apparent discrepancy is explained when attention is drawn to the fact that many of these animals aborted more than a year before the test was applied. It is assumed that the negative reactors in this group have lost whatever immunity they may have gained or their abortions were due to mechanical causes. The significance of the large number of negative reactions given by herd bulls should not be overlooked. Summarizing we find that out of the total 480 animals tested 171, or 35.6 per cent., gave evidences of infection and 293, or 61.1 per cent., were free from it.

When it is understood that practically all the animals represented in the above figures came from infected herds the percentage is not larger than should reasonably be expected.,

Experiments in attempting to eradicate contagious abortion from infected herds by using the complement fixation test as a means of detecting infected animals are well under way. Although not yet completed, the results so far obtained are very encouraging and indicate that this may result in an effective means of controlling contagious abortion. In one herd where the positive and negative reactors were separated and placed in different quarters with special attendants, after a period of four months no abortions had occurred among the first group of cows, while two premature births and four healthy calves had been dropped by the second group.

The question of immunity may be studied to the best advantage by the use of the complement binding reaction as a means of checking up results. Our attention was first directed toward the importance of this when large herds of cattle in which contagious abortion was known to exist were tested. It was ob-

served that a number of animals which had never aborted gave positive reaction. Some of these undoubtedly had become infected quite recently and even aborted subsequently. Others, however, were actively immune to abortion infection, although they had never aborted.

We are not yet fully prepared to state how effective is the immunity possessed by cows which have never aborted, but which give a positive reaction. Experiments now under way will materially assist in solving this very important and extremely practical problem.

This brings up the matter of actively immunizing cattle against contagious abortion by the administration of a vaccine or bacterin. So far, nothing at all reliable has been advanced as a treatment and the prospects of discovering a curative agent appear to be as remote as ever. Consequently, our aim must be to find an effective preventive. Vaccination may be the solution.

In conclusion, it may be said that the complement fixation as applied to contagious abortion is a delicate, specific reaction, which is as accurate as any biological test. It provides a trustworthy means by which infected animals may be detected, afterward proper methods of segregation may be carried out and the disease brought under control.

The test does not distinguish between animals which are harboring the active organisms and those which are immune. Practically this makes but little difference, for the infectious and immune animals can be isolated together with impunity.

Before closing, we desire to acknowledge the assistance given in the technique of manipulation by Dr. W. P. Larson, formerly associated with us, but now of the University of Minnesota. Through the kindness of Dr. Holth of the Royal Veterinary Laboratory at Copenhagen, who was one of the original workers in this field, Dr. Larson became familiar with the test. Further, we are indebted to the owners of the various dairy herds whose hearty coöperation has made this work possible.

The receipts and disbursements of the A. V. M. A. have reached the sum of \$8,000 a year.

PREVALENCE OF GLANDERS, COMMON MODES OF DISSEMINATION, CONTROL AND ERADICATION.*

By J. G. WILLS, B.S.A., D.V.M., ALBANY, N. Y.

Glanders or farcy is one of the most important infectious diseases of horses with which live-stock authorities have to contend at the present time. It has appeared in practically every portion of the civilized world, inhabited by the equine race. The disease is widely distributed upon the American continent, and at the present time there is no considerable section of the country where horses are found entirely free from occasional cases. The possible transmission of the disease to man adds to its importance from the standpoint of human as well as veterinary medicine.

The spread of glanders has been aided by promiscuous traffic in horses and mules, by the assemblances of large numbers of these animals in the execution of public enterprises, such as canal and highway building, by the collection of cavalry horses at army manoeuvres and similar gatherings, and in fact by the intermingling in various ways of infected animals with others capable of acquiring the disease. We are told by the older writers upon this subject that glanders has been noticed to have increased in prevalence after the close of the great wars, this being especially noted after our own Civil War, when it was carried to many districts previously free from it, by infected horses and mules from the armies of the North and South. Likewise the Mexican and Spanish-American wars aided in introducing the disease into Mexico, Cuba and adjacent islands.

Glanders is said to be unknown in some of the isolated countries, especially where efforts have been made to prevent its entrance; among the most notable examples of which are the islands of Australia, Iceland and New Zealand, the disease having been

*Presented to the forty-ninth annual convention of the American Veterinary Medical Association at Indianapolis, August, 1912.

kept from gaining admittance by rigid quarantine, and careful veterinary inspection of all imported solipeds. In western United States and Canada the disease is more or less prevalent, but apparently not as much so as in the larger cities, and more thickly populated districts of the East, where conditions present more favorable opportunities for its spread.

The means by which glanders is distributed were until recent years little understood, and even at the present time there is a wide difference of opinion among scientific men in relation to many of these questions. It was formerly believed that the disease was disseminated directly from the infected to the healthy animal, later it was found that it followed contact of susceptible animals with contaminated objects occurring in stables in which glandered animals had been kept, and where disinfection had not been thorough. In this way the public watering trough, blacksmith shop, hitching stables and similar agencies have come to be considered as important communicating channels in localities where glanders is prevalent. Irresponsible horse dealers are also important mediums for the distribution of infected horses, and the wandering gypsy horse trader has always been credited, sometimes unjustly, with having carried the disease to localities where it was seldom, if ever, known previous to his visit. Owing to the character of the malady, the most careful physical examination by a skilled veterinarian does not prove of any great value in protecting against purchasing infected animals.

Veterinarians are also in some parts of the country to be held responsible to some extent for the increase in prevalence of the disease. This may sometimes be due to ignorance, or a positive indifference as professional men, to the welfare of the public. The fear of financial loss because of decrease in patronage may cause the unscrupulous practitioner to conceal from his client the true nature of the ailment, and may lead to the suggestion that the owner dispose of the diseased horse, which results in the infection being scattered and perpetuated. Treatment is sometimes suggested by such men in order to obtain the fee, when a more careful consideration of the case would show that such

a procedure was not only useless but dangerous. The concealment or disposal of known glandered animals by veterinarians and others, so that they may not come to the attention of proper health or sanitary officials, is a custom productive of many bad results and cannot be too severely censured.

The theory, formerly quite generally accepted, that only visibly glandered animals are dangerous is now doubted, although this is a much disputed question. It is possible, and indeed probable, that cases of pulmonary glanders and other internal forms of the disease could exist in such a stage of development as to allow the infecting virus to escape from the body of the host, and yet the animal be apparently healthy as far as physical appearance would indicate.

The investigations that have so far been made tend to show that glanders is most often contracted by the entrance of the organism into the alimentary tract of the healthy animal. Infection through the broken skin or respiratory mucous membrane is by no means unimportant, the latter being more common if there is exposure to particles upon which the germ might be carried. Inoculation through the skin or membranes other than those mentioned is comparatively uncommon and therefore not as important.

Since the bacterium *mallei* is strictly a parasitic organism, having no known habitat, except in the tissues of the infected host, it is evident that could the escape of the virus be prevented, the disease would disappear upon the death and proper disposal of the individuals now infected. While this is an attainment to be earnestly sought, its accomplishment presents almost insurmountable difficulties in glanders as in many other diseases. We are, therefore, confronted with the problem of determining when the virus escapes from an infected animal, and the means by which it reaches the tissues of the succeeding host. While there are many obscure carriers of the germ, it is quite obvious that the danger of infection is in quite direct proportion to the proximity of the susceptible animal to the spreader, whether it be by direct contact or through inanimate objects, such as water, food,

utensils or surfaces where the virus has been recently deposited. One of our greatest difficulties, therefore, is to determine when glandered animals become capable of distributing the infection, and how to detect the approach of that stage of disease. Although there are at the present time several specific procedures for the detection of glanders there seems to be none that can be entirely relied upon, or that is accepted as meeting all requirements. Of the common methods, mallein, the agglutination and complement-fixation tests seem to be the most satisfactory, although each has its advantages and limitations. No test seems to have yet been devised indicating in any positive way the extent of development of the disease in the living animal.

The control of glanders presents one of the most complicated problems with which the veterinarian has to deal. The greater prevalence of the disease in the city brings into consideration difficulties not encountered in the country. Among these may be mentioned closer contact on the streets, more crowded stables, undesirable sanitary conditions, animals handled by unskilled persons, having no pecuniary interest in the animal and many other conditions. On the other hand, more satisfactory methods of inspection and supervision can be put into effect in districts where horses are stabled in large numbers than where they are running at large upon the range, or kept upon widely separated farms where it is not possible or practicable to make as frequent examinations, and where veterinary assistance is not always easily available. Eradication of this disease where a large number of animals have been exposed, or may be infected, becomes from an economic point of view a matter of great difficulty, and the attitude of the owner of the animals must be considered when devising any method of control. In many instances, more satisfactory arrangements for supervision or control can be made with those who own large numbers of animals than is the case with the person who has only a small financial interest in live-stock and is disposed to resist interference.

In the control of glanders, one of the most perplexing questions is in reference to disposition of occult cases,—those ani-

mals in which diagnostic agents have indicated glanders. The fact that we are unable to determine how soon such animals become "spreaders," or what percentage of such cases will recover, leaves a most important problem unsolved. The large number of reacting, but apparently sound equines which would be found if all horses in certain districts were tested, makes it impracticable to destroy all such animals, as appropriations for the payment of indemnities to owners cannot in most states be obtained, and the confiscation and destruction of live-stock without payment of some compensation while it may be theoretically proper, in practice only results in dissatisfaction and opposition. Where but a small percentage of animals are found glandered, a radical method is to be advised, but the depletion of the equine population would be so great if such a plan were put in effect in our large cities that it is very doubtful if public sentiment would allow such a method to be carried to a successful conclusion, even if sufficient funds for so doing could be obtained. The reports of certain veterinary practitioners indicating that only a small percentage of occult glandered animals develop into clinical cases of the disease would, if correct, tend to show that proper supervision of such cases would be sufficient, and that slaughter would not be necessary, except in such as develop physical evidence of the disease.

Prognosis in reference to animals suffering from occult glanders is dependent upon so many influences, both internal and external, that accurate prediction as to the outcome in individual cases is impossible.

In some of our larger stables careful attention by a competent veterinarian, with the immediate destruction of all clinical cases of the disease, has apparently controlled the outbreak. It is probable, however, that by this method infected animals are still left in the stable and some of such arrested cases, if subjected to unfavorable conditions, might again develop active glanders and become sources of danger.

The possibility of successfully treating glanders has been widely discussed. There is no doubt that many horses become

infected, but never develop external evidence of the disease, or become dangerous to others. Some such cases apparently remain in the quiescent stage for years, but the lesions may become active should the vitality of the animal be lowered by other diseases, overexertion, unsanitary surroundings or any other debilitating influence. In other animals, because of the resistant forces in the body of the host or because of the virus being attenuated, the disease is confined to a small area and becomes sufficiently encapsulated to effectually prevent further increase of glanderous tissue, unless affected anew.

Our lack of experimental data as to what proportion of infected animals recover or progress to advanced glanders, makes it impossible at the present time to suggest any definite method in relation to the control of the disease. While we all have certain theories and opinions in relation to these points, yet when we attempt to prove our contention, we find that there is practically no authoritative data upon which to base our conclusions.

The tendency to consider animals as cured or healed when the disease is only arrested has resulted in much discussion and dissension among veterinarians and others who have studied this disease. It is very doubtful if an animal which has well developed glanderous lesions in its body can ever be considered permanently cured, in the strict sense of the term. If clinical evidence of the disease is ever shown, we believe that such animals should thereafter be considered as a menace to all susceptible species, and absolutely segregated or destroyed.

Glanders vaccine as a prophylactic and curative measure has been quite widely advocated. The results obtained have been, as far as we are able to learn, indefinite. The use of vaccine has contributed to the existing confusion in relation to glanders and because of its indiscriminate use often by incompetent men, and under unfavorable conditions, has been productive of more harm than good. The use of such products before their value has been determined by proper scientific experiments only tends to complicate the situation. Since the administration of glanders vaccine interferes more or less with the various tests for

glanders, its use should be prohibited, except under proper supervision, until such time as its value can be with certainty determined. It is desirable that we minimize as far as possible the opportunities for complications and mistakes by preventing the use of biologic products by the unskilled men. The development of modern methods of diagnosing glanders has placed in the hands of unscrupulous persons a means of detecting many occult cases of this disease, enabling such persons to arrange for disposition of suspicious animals, if they are so inclined.

All animals showing suspicious evidence of glanders should be brought to the attention of the proper health and sanitary officials, so that they may be kept under proper observation. The disposal of suspicious animals should be prohibited and a heavy penalty inflicted upon violators of such orders. The inspection of all equines passing from one state or province to another will evidently have to be required, and the movement of such animals, except when accompanied by certificate of health, prohibited. Thorough disinfection of premises where known glandered animals have been kept or harbored is essential, and neglect of this precaution has been a prolific means of infection in the past.

Our lack of scientific knowledge in relation to many of the points which have been touched upon here would seem to necessitate further investigation before we can determine upon a method of control of this disease that will be effective. Furthermore, it is very evident that a uniform scheme applicable to all conditions and to all sections of the country can hardly be possible, owing to the varying circumstances under which animals are stabled or harbored, the difference in climatic conditions and many other influences beyond the control of man.

There are in our opinion four important questions to be considered and at least partially solved before we can expect to make any great advances in the control or eradication of glanders:

1st—The development of an accurate method of diagnosis adapted to general use.

2nd—Some positive knowledge as to the relative danger from occult, but known glandered animals, as compared with those showing physical evidences of the disease.

3rd—More definite information as to the efficiency of glanders vaccine, which is credited by some with having certain immunizing or curative properties.

4th—More conscientious and better trained veterinarians, who will more carefully consider the interests of their clients, and by so doing assist in protecting against losses from infectious diseases.

In the foregoing paper we have endeavored to point out some of the difficulties which have seemed most important, and have refrained from attempting to suggest definite methods of control of glanders. By referring to a few phases of the subject, we hope to have prepared the way for a further consideration of the disease by the experts here assembled, believing that more knowledge will be gained in discussing the situation than is possible by placing before you the opinions and views of one observer.

THE LAKE ERIE VETERINARY MEDICAL ASSOCIATION will hold its next regular business meeting at Lorain, Ohio, October 8, and Secretary Fulstow desires to see a full attendance.

A FAVORABLE COMPARISON OF STATISTICS.—There are to-day about 800,000 automobile registrations in this country, of which about 20,000 relate to trucks and delivery wagons. Against these totals it is recalled that there are approximately 21,000,000 horses in the United States, that about 7,000,000 horse-drawn vehicles are in daily use and that American manufacturers are still producing yearly some 1,750,000 more.

In view of these facts it cannot be said that the horse is as yet "passed." It is also a fact that while the cost of horses and horse feed has been constantly advancing the prices of automobiles and motor vehicles, gasoline and electricity have been steadily on the decline * * *.—(Extract from *Rider and Driver*).

GLANDERS VACCINE.*

BY ROBERT S. MACKELLAR, V.S., NEW YORK, N. Y.

The use of glanders vaccine as an immunizing agent was first begun in New York City during the summer of 1907.

In a paper entitled "The Diagnosis of Glanders in the Human Subject from the Viewpoint of a Veterinarian," by Dr. A. Silkman, Veterinarian, New York City Department of Health, read at the February meeting of the Veterinary Medical Association of New York City and subsequently published in the *AMERICAN VETERINARY REVIEW* of June, 1907, also in the *Medical Record* of October 5, 1907, Dr. Silkman advocates that a special preparation of mallein might be of assistance in combating the dread scourge of glanders.

Working along these lines, with the assistance of the Research Laboratory, Department of Health, New York City, a glanders vaccine was prepared in the following way:

Bacillus mallei is inoculated upon 3 glycerin potato agar tubes, and allowed to grow at incubator temperature (37° C.) for 24 hours. To each tube is then added 2 c.c. of sterile, physiological salt solution, and the surface growth is made into a suspension by rubbing up with the salt solution by means of a strong platinum wire. The suspension from the three tubes is added to a flask containing 500 c.c. of sterile nutrient broth. The inoculated flask is incubated for 72 hours. At the end of this time the flask is removed from the incubator and the culture is tested for purity. If a pure culture, the flask is placed in a water bath and gradually brought up to 70° C., and held at that temperature for two hours. After the heating is completed and the material is tested for sterility by making inoculations upon glycerin potato agar, and incubating at 37° C. for about 48 hours. If sterile, add 50 c.c. of a 5 per cent. solution

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of carbolic acid to the 500 c.c. of the vaccine to prevent infection. Then the vaccine is ready for bottling. The bacterial count is 100,000,000 bacteria per c.c.

This vaccine is inoculated subcutaneously in three separated doses, a week apart, under aseptic precautions, viz.: clipping the hair and washing point of inoculation with a 5 per cent. carbolic or a 1-1,000 bichloride solution.

The first injection consists of 1 c.c., the second $2\frac{1}{2}$ c.c., and the third 5 c.c. of the vaccine.

In some animals a marked thermic and local reaction occurs, lasting for several days. The local reaction in these cases is usually a large edematous swelling, which in a few instances has exuded a serious exudate. These cases however are rare, and it has been our experience that not over 1 or 2 per cent. of the animals inoculated are incapacitated for continuing their regular work.

The first stable in which we applied the vaccine was one containing 150 head of draught animals. Glanders developed in this stable and fourteen head were condemned and destroyed on physical symptoms and the mallein test.

The agglutination test of the remaining 136 head resulted in 77, showing a reading of 1,000 and up to 10,000.

The vaccine was then administered with the result that two or three animals very soon, after the first injection, developed a negative phase, and presented physical symptoms of glanders and were destroyed. We find that where the glanders lesions are in an advanced stage the use of the vaccine will produce negative phase, followed quickly by development of physical symptoms.

The animals remaining in this stable were subjected to the vaccine treatment six months later, and again in six months from the second treatment. None of these animals treated in this manner have developed glanders up to the present time.

A gray gelding recently purchased from another firm in June of this year (1912) developed a clinical case of glanders and was destroyed. The owners of this establishment were so

favorably impressed with the previous result of the vaccine treatment that they requested it be used again.

This was immediately done during the month of July and up to the present time no further cases have developed. In another large brewery stable fourteen head of horses were destroyed on physical symptoms, and the mallein test during the winter of 1907-1908. Eighty-one horses were subjected to the agglutination test and forty-nine gave a reading of 1,000 and up to 10,000.

At this time the proprietors requested that a consultation be held, which was done, and consisted of the attending veterinarians, the Department of Health veterinarian and two prominent practitioners of New York City. Each and every animal was given a rigid physical examination and at the suggestion of the consulting veterinarians a few showing slight physical symptoms were quarantined in a small stable set aside for that purpose. All of the animals were given the vaccine as in the first stable mentioned above, with results very similar. Three "breaking down" after the first or second injection of the vaccine.

Among those quarantined a pair of roan geldings proved to be very interesting cases. On physical examination the sub-maxillary glands were found to be very much enlarged, and several of the lymphatics prominent and carrying a temperature prohibitive of the mallein test. The agglutination reading of each was 10,000. These animals were carefully watched and in addition to their regular doses of vaccine were given seven additional doses of 5 c.c. at regular intervals. Their temperature ranged from 100° to 106° F. for over three months, when it finally became normal.

They were kept in quarantine for about eight months, at the end of which time all symptoms having abated they were returned to the main stable. These two geldings are alive and performing their regular work at the present time, after a period of four years.

This stable was also re-inoculated six months later, and the

results have been very satisfactory. Not a single case has developed since. In another stable of seventy head an outbreak occurred which resulted in the loss of several animals and worse than all the death of the veterinarian who was there in attendance and contracted the disease.

The same methods were pursued in this stable as in the two previously mentioned, with a result that not a case has developed in nearly four years.

This course has been pursued in a large number of other stables, and in nearly all instances with gratifying results. The above cited cases will tend to give an idea of the method of procedure.

In animals giving a pronounced thermic and local reaction we have found it advisable to make a few additional injections of the vaccine until a permanent positive phase has been established.

The general improvement in the physical condition of animals after the vaccine treatment is decidedly marked. The coat becomes smooth, and they as a rule gain in weight. One owner remarked "that it acted better than any tonic powder he had ever used."

It is undoubtedly true that a horse may give a positive agglutination reading and still not give a mallein reaction. We believe this also to be true of the complement fixation test. This seems to be due to the fact that the glanders bacilli is present in the system but no active lesions. The question now comes up, "Has the horse enough natural immunity to overcome the infection?" By the use of the glanders vaccine the opsinins are increased and aided in overcoming the infection. Just what action the vaccine has on the blood is not known except that it increases the opsinins and anti-bodies.

Mallein itself will give a small amount of immunization but nothing to compare with the vaccine containing the dead organisms.

The question has been raised, viz.: "If a horse was vaccinated with glanders vaccine in New York City and said horse

be shipped to Philadelphia, and should there show symptoms of glanders, and the owner would send a sample of the blood to any laboratory to be tested by the agglutination method or the complement fixation test, what would happen?"

In answer to this, we quote Dr. A. Silkman who states that: "Personally I would say that a certificate should go with the horse stating that he had been vaccinated, the date, and by whom. The vaccine will undoubtedly interfere with either of the above tests. The mallein test would be the only one to rely on. Some claim that a horse will give a mallein reaction after the use of vaccine. This has not been my experience. The horse having received as high as 30 c.c. of glanders vaccine, as a dose, did not give any mallein reaction."

The post mortem findings in horses following the use of vaccine are quite interesting. There is quite a marked change in the appearance of the lesions and it also appeared that they were becoming encapsulated.

Quoting from the last report of the New York State Veterinary College in reference to glanders it is stated that "this disease seems to be spreading quite rapidly in the state. The steady increase in the spread of glanders should be a warning to all veterinarians who should be constantly on their guard for this most serious of diseases of the horse kind."

This indicates that the methods of control and eradication, which now obtain, are insufficient to even prevent the spread of the disease, far less its extermination. It would therefore appear that some measures such as have been recited in this article may and probably without any doubt would help to change this to be regretted condition.

During February, 1911, Dr. A. Silkman under the direction of Dr. William H. Park, Director of Research Laboratory, New York City, started a horse on glanders vaccine in an effort to produce a highly immunizing serum. The results up to the present time have been highly gratifying.

Any veterinarian desiring the vaccine to give it a trial can have it by sending his name and address to Dr. W. H. Park,

Director of Laboratories, Department of Health, New York City (foot of East 16th street).

It may not be within the province of this article to suggest any other methods for the control of glanders, but we cannot refrain from expressing the opinion that if a more extended inspection of all stables, especially those in the large cities, were made, all diseased animals promptly destroyed, quarantine stables established where those of a doubtful nature could be safely kept, and all others minimized by the use of glanders vaccine, it would soon result in the control and ultimate eradication of this scourge.

THE HUMANE TREATMENT OF ANIMALS is taught by Edward H. Packard of Massachusetts by a moving picture campaign. Mr. Packard has accumulated a number of pictures showing needless suffering of animals, which he is placing in the moving picture houses throughout the state. Mr. Packard is the field agent of the Massachusetts Society for the Prevention of Cruelty to Animals.

THE HORSE BREEDING INDUSTRY IN NEW YORK STATE has been receiving considerable attention from Commissioner Huson during the past year, and we are looking forward to a marked improvement in that direction in the near future. The commissioner fully appreciates the dearth of suitable horses in that state, for farm work and other business purposes, and he also fully appreciates the fact that New York State is eminently suitable for the production of that class of horses, just as much so, as for the production of the trotting horse, for which it has long been famous; he has been investigating the matter of horse breeding pretty thoroughly, and has no doubt formulated plans for the economical improvement and production of the work horse in that state, which will prove of great value to those engaged in agricultural pursuits.

QUARANTINE AND DISINFECTION IN CONNECTION WITH OUTBREAKS OF GLANDERS.*

BY GEORGE W. POPE, D.V.S., WASHINGTON, D. C.

The necessity for imposing a lengthy quarantine upon stables in which the infection of glanders has appeared has of late years been obviated as a result of modern methods for diagnosing the disease.

Some of the older members of our profession will remember when we were handicapped in this respect. For instance, in the State of Illinois some twenty years ago the appearance of glanders in a stable resulted in the slaughter of animals exhibiting clinical evidence of the disease and the establishment of a ninety days' quarantine, with frequent inspections of all horse stock in the stable during such period.

Such prolonged quarantine and repeated inspection was annoying to the owner and, while at that time the best known method of handling the disease, served but poorly for the eradication of same from an infected stable.

Later came the mallein test, not an infallible method of diagnosis, but one which enabled the practitioner to remove many affected animals which would not be discovered by physical examination.

Following was the application of the serum agglutination and precipitation reactions and still more recently we have been favored with the adaptation of the complement fixation test in the diagnosis of this disease, this probably being the best method for the determination of the presence of glanders which we have at our command at the present time.

Thus with our present methods of diagnosis a long and tiresome quarantine is not required.

However, the establishment of a quarantine and the question

*Presented to the forty-ninth annual convention of the American Veterinary Medical Association at Indianapolis, August, 1912.

of the same being close or modified will depend largely upon the authority vested in the sanitary officer by law.

In view of the ready means now at hand for determining the presence of the disease, it is doubtful if other than a provisional quarantine is necessary in these cases, and while it is not possible to prescribe any hard and fast rule which will govern in all instances, much depending upon circumstances and extent of authority, the following is suggested as a method that can be very generally adopted and which, while imposing upon the owner the least possible inconvenience, should yield satisfactory results in the eradication of the disease.

Such methods consists in the establishment of a provisional quarantine either prior or subsequent to the removal of all animals which upon physical examination have been condemned as affected with the disease.

The owner need not be prohibited from using the remaining animals provided they are entirely free from any evidence of the affection.

Certain restrictions, however, should be imposed including the closing of the stable water trough and the providing of a water bucket for each individual horse, the same to be used both in the stable and on the road.

Brushes and curry combs should either be immediately destroyed or thoroughly disinfected. The stalls vacated by condemned horses should be closed. Outside horse stock should not be permitted to enter the stable and the provisionally quarantined animals should likewise be prohibited from entering any stable other than their own, to feed at any public rack or drink from any watering trough whatsoever.

Having established such precautionary quarantine, immediate measures should be taken to secure blood samples from all horses in the infected stable for the purpose of submitting the same to the complement-fixation test.

The taking of blood and test of same will consume but a few days, this, however, depending somewhat upon distance from the laboratory to which the material is forwarded.

After removing and destroying all animals proven by such test to be affected, the stable, together with utensils, harness, etc., should be thoroughly disinfected.

Three weeks from the date of above test, blood samples should be taken and a second test made in order to determine whether or not any of the remaining animals have developed the disease during the interval between tests, this being a possibility in certain cases as a result of previous heavy exposure.

Should there be no reactions to such test the quarantine may be raised. Likewise should one or more horses prove infected as a result of this second test it will probably be evident upon post mortem that the disease was of very recent origin, and under such circumstances it will not be necessary to give the entire stable a second disinfection but that immediate portion of the building which has been occupied by the reacting horses should be thoroughly disinfected, after which the stable may be given a clean bill of health.

DISINFECTION.

In connection with the work of disinfecting a contaminated stable there are three essentials:

First—A preparation of the building that will facilitate reaching the organisms of disease.

Second—A disinfectant which upon contact can be depended upon to destroy such organisms.

Third—A method of applying the disinfectant that will assure the most thorough contact with the bacteria.

Before beginning the use of a disinfectant it is essential that certain preliminary work be done in and about the stable that is to be treated. The various surfaces, such as ceiling, walls, partitions, floors, etc., should be swept until free from cobwebs and dust. Any accumulation of filth should be removed by scraping and scrubbing with hot water and washing soda. In some cases the woodwork may have become softened and so porous as to be a good medium for the absorption of disease germs. Such woodwork should be removed, burned, and replaced with new material.

All refuse, manure, etc., from stable and stable yard should be removed to a place inaccessible to live stock and, if possible, be burned or thoroughly mixed with a solution of chloride of lime in the proportion of six ounces to one gallon of water. If the floor is of earth, it will doubtless have become stained with urine and contaminated to a depth of several inches. In such cases four inches or more of the surface soil should be removed and treated as above suggested for refuse and excreta. All earth removed should be replaced with soil from an uncontaminated source, or, better, a new floor of concrete may be laid, this being the most durable and sanitary material for the purpose.

Having made ready the field of operation, the next consideration should be the selection and preparation of the disinfectant.

The fact must not be overlooked that many agents used for the destruction of bacteria are likewise poisonous to animals and man. In fact, some drugs, although powerful as germicides, are so poisonous as to preclude their general use in the work of disinfection. Among such is bichloride of mercury, which possesses the power of destroying not only bacteria, but spores as well.

But while possessing great germicidal power in a solution of 1 to 500 or 1 to 1,000 and having the advantage of low cost and of leaving no odor in the stable, bichloride of mercury has the disadvantages of being a violent poison, of corroding metals and of uniting with albuminous substances, such as excreta, blood, etc., and thus forming inert compounds.

Thus care should be exercised in the selection of the disinfectant, and an agent should be selected having a known germicidal strength, properties of solubility, and at the same time possessing a reasonable degree of safety to animals and man.

All things considered, it is probable that some of the coal-tar products best fulfill these requirements. In this class is the compound solution of cresol, a preparation recognized by the United States Pharmacopeia and known as liquor cresolis compositus (U. S. P.). This preparation mixes readily with water and will prove a very efficient disinfectant. It should be used in the proportion of four or five ounces to each gallon of water.

Another favorable agent is cresol (commercially known as liquid carbolic acid). It is not as soluble as liquor cresolis compositus and should be thoroughly stirred during the process of mixing, which will be facilitated by using hot water. It is advisable to secure a grade of drug with a guaranty of 95 per cent. pure, and such should be used in the proportion of two or three ounces to a gallon of water.

As an accessory preparation and for use after the application of the disinfectant it may be advisable to make ready a lime wash to each gallon of which there has been added four ounces of chloride of lime, or, if it appears desirable to use the disinfectant and lime wash at one application, the following method may be followed in preparing five gallons:

Slake seven and one-half pounds of lime, using hot water if necessary to start action. Mix it to a creamy consistency with water. Stir in 15 fluid ounces of cresol (commercially known as liquid carbolic acid) at least 95 per cent. pure, and make up to 5 gallons by adding water. In case compound solution of cresol (liquor cresolis compositus) is used, add 30 fluid ounces instead of 15 as in the case of cresol (liquid carbolic acid). Stir thoroughly. If to be applied through a spray nozzle, strain through a wire sieve. Stir frequently when applying and keep covered when not in use.

The entire interior of the stable should be saturated with the disinfectant and special attention should be given to the feeding troughs and drains.

If a good spray pump is used and the operator uses care to cover the entire surface and drive the disinfectant into every crack and crevice, he may be reasonably certain that he has destroyed any organisms of glanders which may have been present.

DR. JAMES T. SHANNON, junior member of the firm of Bryan and Shannon, Lexington, Ky., has retired from the firm, but will continue to practise veterinary medicine.

ANTHRAX OF ANIMALS IN PANAMA, WITH A NOTE ON ITS PROBABLE MODE OF TRANS- MISSION BY BUZZARDS.*

BY DRS. S. T. DARLING and L. B. BATES.

In presenting these notes, we are pleased to be able to state that very few cases of anthrax in animals have been brought to our attention during the past seven years. One was a cow from a dairy at Empire, C. Z., and the other a hog from the Panama abattoir.

On account of the infrequency with which anthrax has been encountered here we believe that the † territory from which Panama obtains cattle and hogs is almost entirely free from anthrax. It is understood that there is no importation of cattle into the Republic at present and this no doubt favors the relative immunity from disease among the herds nearby.

From conversations with local cattle men it would appear that anthrax has been rife in the Republic in the past, and pastures on the Sabanas just outside the city of Panama have been infected with the disease. Not only so, but occasionally the sick cattle were hurriedly butchered and the meat sold at reduced prices to the very poor by whom it was consumed.

Meat inspection at the Panama abattoir at the present time is a satisfactory one, for the local inspector is a veterinarian, and in addition to his familiarity with diseases of cattle, he takes advantage of the facilities offered by our laboratory for the bacteriological and histological examination of material from suspected animals, and we are indebted to him for the material obtained from the case of anthrax of the hog reported here.

On April 1, 1911, an autopsy was held by one of us on a cow that had died at Empire at one of the dairies.

*Read before the Canal Zone Medical Association, August 14, 1912. From the Board of Health Laboratory, Ancon Hospital, Ancon, Canal Zone.

†The beef slaughtered in the local abattoirs is used almost exclusively by the native and West Indian population. Commission employees are supplied with cold storage beef from the United States.

The cow had been milked in the morning and was being driven along a path to the pasture when she fell. She was helped up, walked a few feet further and then fell again. Respirations became labored and the animal died in a few minutes.

The autopsy was held four and one-half hours after death. The udder contained milk and appeared normal. There were a few patches of broncho-pneumonia along the margins of the left lung. The heart contained a few epicardial petechiæ, but the muscle appeared normal. Cultures were taken from the left ventricle. The spleen was greatly enlarged and weighed about ten pounds. There were no capsular hemorrhages, but the pulp was tremendously diffuent and bulged above the cut surface. The liver was very moist on section. The borders were a brown color, and the branches of the portal vein were surrounded by parenchyma of a dirty light gray color, marking out a peculiar arborescence of necrosis. The mesenteric and post-peritoneal lymph nodes were enlarged and blood-stained. The gall bladder was full of pale clear fluid bile. The kidneys and bladder appeared normal.

Smears from the liver and spleen contained myriads of large Gram-positive bacilli, resembling anthrax bacilli. The Löffler's stained preparations presented a slight halo or capsule around each bacillus. The Hasting's preparations stained diffusely dark purple. No spores were detected in the smears from tissue. Cultures from Heart's blood into broth, blood serum and agar gave a pure culture of *B. anthracis*, which when placed out and sub-inoculated into media and guinea pigs, presented all the characteristics of this organism.

Sections of tissue from spleen, liver, udder and a lymph node contained enormous numbers of anthrax bacilli.

At the conclusion of the autopsy the carcass was covered with coal tar disinfectant and immediately burned.

Before the autopsy was begun, buzzards had appeared on the scene and had partly torn out the eyes.

The sale of milk was interdicted, the herd was visited at frequent intervals and temperatures of a number of the animals

taken, but no secondary cases were detected in the herd. It is believed that the infected cow was one that had been recently added to the herd from a neighboring village in the neighborhood of Chorrera, where it is known anthrax had made its appearance in the past.

The local abattoir at Empire has been very carefully and regularly inspected, but nothing suggestive of anthrax has been detected among any of the animals slaughtered there.

The case of anthrax of the hog is of unusual interest, for in the first place it is an example of this disease in an animal relatively insusceptible to it, in which the cervical lymph nodes alone were involved, and secondly, it affords what appears to be an excellent illustration of true bacterial symbiosis. According to Friedberger and Fröhner (*Friedberger and Fröhner, Veterinary Pathology, 6th Edition, Hurst & Blackett, London, 1908, Vol. II., page 560*) "cases of spontaneous anthrax in pigs are rare * * * pigs are more or less immune to anthrax which can be transmitted to them only with great difficulty." The inoculation experiments of many investigators have been followed by negative results. The literature on this subject would indicate that the commonest form of anthrax among hogs is the result of their eating infected flesh, and the disease presents itself as an angina characterized by edema and hemorrhagic necrosis and infiltration of the pharynx. Associated with this is hemorrhagic necrosis of cervical lymph nodes. "McFadyean has reported an outbreak of anthrax in which about 14 pigs were attacked with anthrax, probably from eating the flesh of an anthrax-stricken heifer. In all of these pigs the most prominent symptom was swelling in the region of the throat. McFadyean states that swelling of the throat in the course of an attack of acute illness is in the pig almost pathognomic of anthrax."

On February 5, 1912, Dr. Bosch, Inspector of Abattoir, City of Panama, brought to the laboratory a mass of encapsulated glands taken from the anterior aspect of a hog's neck. This hog was one of a herd brought from the interior of the Republic and one or two others had the same lesion similarly located. Dr.

Clark made smears from the cut surface of the glands and found them to contain an abundance of micrococci occurring in clusters and a few large square-ended Gram-positive bacilli which stained interruptedly and presented a halo resembling a capsule. The cut surface resembles a lymph node with interlacing lines of diffuse hemorrhage and caseous necrosis.

In frozen and paraffine sections, the tissue was seen to be made up of lymph nodes, the seat of extensive hemorrhagic edema, necrosis and leucocytic infiltration involving the nodes and surrounding tissue. Many anthrax bacilli were detected in the sections, particularly in the loose lymphoid tissue, while in the areas of necrosis enormous numbers of micrococci were associated with them.

Smears from one of the glands taken from bacteriological examination contained many small Gram-positive diplococci and occasionally large square-ended Gram-positive bacilli, a few of which contained equatorial spores. The bacillus presented the cultural characteristics of *B. anthracis*, and was pathogenic to guinea pigs. The diplococcus measured about one mu. in diameter. It stained readily with the anilin dyes and was Gram positive. No capsule could be detected. It was nonmotile. Gelatin stab cultures were not liquefied and the growth was filiform. On agar plates the colonies were punctiform, convex, and the internal structure was grumose in the centre and strongly refractive. The edges were entire and the optical character might be classified as sebaceous. The growth on potato was invisible at the end of 18 hours, and on agar slants the colonies were round and tiny like a streptococcus. There was no apparent growth in broth, but milk was decolorized in 18 hours, became strongly acid in 72 hours and was coagulated on the fourth day. Gelatin was not liquefied. In dextrose, lactose, saccharose, galactose, mannite, and dextrine semi-solid, acid was formed, but no gas. In dulcitol semi-solid there was neither gas nor acid. The micro-organism did not survive but a few days on media and it was not pathogenic for guinea pigs.

Taking into consideration the insusceptibility of hogs to an-

thrax, together with an examination of the lymph nodes in our case, we are of the opinion that the infected glands illustrate bacterial symbiosis, and that in all likelihood the diplococcus which was present in by far the greater numbers prepared the field in the lymph nodes for the limited activities of the anthrax bacilli.

Our observation that buzzards had flocked to the carcass of the cow and that they had begun to feed upon it led to further observations on the habits of these birds when eating carrion. They congregate about a dying animal, plucking out the eyes and tearing off soft parts even before death. Thus they pick away the mucosa of the anterior nares, pluck out the eyes and the soft parts around the anus and sheath. As decomposition advances and the tissues soften, the birds crowd into and upon the carcass, literally smearing the decomposed material over their plumage. In the case of an animal dying of anthrax, the tissues contain enormous numbers of bacilli. These in contact with air on the plumage of the bird go into spore formation, and buzzards most certainly act as carriers of infection, by transporting anthrax bacilli and spores from one place to another in this way. Some personal (immediate) contact with animals or pastures would be necessary in this case for infection. If, however, the spores of anthrax bacilli pass intact through the intestinal tract of buzzards, pastures might be infected from the droppings of birds that had fed on animals dying of anthrax.

The following experiments were carried out to determine the likelihood of that possibility. Three turkey buzzards were selected from a lot supplied through the kindness of the Health Officer, Panama, and the Sanitary Inspector at Empire. The buzzards were kept in an isolated room and were given a plentiful supply of drinking water and chopped meat. This meat was thoroughly soaked and mixed with a saline emulsion of anthrax bacilli and spores grown on agar plates. On account of the filthy habits of the birds, it was impracticable to obtain specimens of feces in which food contamination could be ruled out except by holding the birds and inserting a swab or catheter into the cloaca. Abundant material was obtained in this way. Specimens were

taken at approximately 12, 36, 60 and 84 hours after feeding. Numerous agar plates were immediately made, but in none was the anthrax bacillus present.

In order to introduce a maximum number of the bacilli, the experiment was repeated with the following variation: Instead of mixing food and cultures a rubber catheter was introduced into the gullet of the buzzard and about 20 c.c. of a very heavy saline emulsion of anthrax bacilli and spores were injected through a catheter into the stomach by a Luer syringe. The buzzards were watched to see that they did not regurgitate or otherwise unlawfully dispose of the dose. Agar plates were made as before, and anthrax bacilli were found to be absent. Shortly after these experiments were completed the birds were killed and cultures taken from various portions of the intestinal tract. Anthrax bacilli were absent.

We conclude from this experiment that pastures and other locations cannot be infected by buzzards through the agency of droppings, but require more intimate contact.

The experiment just outlined illustrates the very powerful digestive mechanism of buzzards for bacteria, and when we consider that the food of carrion birds is sometimes almost wholly bacteria and bacterial products, we are not surprised at the facility with which they appear to destroy all bacterial species. On the other hand they do not appear to be proof against Thallophytes, for most of the buzzards retained under observation and not used in the above experiment died of intestinal and peritoneal aspergillosis.

DR. FRED F. BUSHNELL, formerly of Middletown, Connecticut, moved to Harvard, Ill., in the early part of the past summer.

LOOKING FORWARD FOR EACH NEW ISSUE.—Dr. George A. Scott, Waterloo, Iowa, says in renewing his subscription to the REVIEW: "I cannot be without it; after reading it for more than fifteen years, it seems like an old companion, and I am always looking forward for each new issue."

ANTHRAX VACCINE.*

BY CHAS. H. HIGGINS, B.S., D.V.S., F.R.M.S., PATHOLOGIST DOMINION DEPARTMENT OF AGRICULTURE, OTTAWA, CAN.

The use of anthrax vaccine has been attended with varying results, some of which have been of a very unenviable character. Since the first demonstration by Pasteur in 1881 and 1882 the vaccine prepared at the Pasteur Institute in Paris has given universal satisfaction, and untoward results have been practically nil when their instructions have been followed to the letter.

My interest in anthrax vaccine has extended over a period of twelve years and at the outset was very discouraging. Using commercial vaccine Dr. Hargrave of Medicine Hat, Alberta, and myself had the misfortune to see five hundred sheep in a band of fifteen hundred fat wethers develop the disease and die after ordinary precautions had resulted in the checking of losses from the naturally contracted disease on an infected range. Subsequently it was found that this vaccine was contaminated as well as being of too high a virulence.

Others here present have probably experienced some difficulty with this vaccine or have learned of serious losses directly attributable to the vaccine and it is my endeavor to throw some light on points relative to its preparation and use which will tend to reduce these undesirable factors to the minimum.

The original vaccine of Pasteur was put up in liquid form and if we can give credence to some of the tradition surrounding its preparation it was purposely contaminated with the bacillus subtilis or the Hay bacillus in order to disguise its true character and render futile attempts to cultivate it from the original. Both organisms, being spore bearing, could live almost indefinitely side by side, yet would puzzle the bacteriologist attempting to grow the vaccine, particularly at that time, owing to the fact that solid media were not then in general use. To Koch

*Presented to the forty-ninth annual convention of the American Veterinary Medical Association at Indianapolis, August, 1912.

I believe belongs the credit of using a solid medium for the growth of this vaccine as originally prepared. He was also able to suggest that the bacillus subtilis was added in an endeavor to baffle the true nature of the virus.

There are various factors which may occasion untoward results when using a liquid anthrax vaccine. We may have a pure culture of too high a virulence—the first vaccine may not offer protection sufficient for the second; there may be a contamination or, the methods of administration may be faulty and introduce with the vaccine an infecting agent which so lowers the natural resistance of the animal that the vaccine increases in virulence at the site of inoculation, leading to an infection and a subsequent outbreak. The latter lies wholly within the province of the administrator of the vaccine and should be guarded against by him at the time of vaccination. The use of culture having too high a virulence or a first vaccine which is greatly attenuated are controlled by the man who prepares the vaccine. He is responsible for such errors and should so arrange his system as to make them practically impossible.

There is an error for which he is not responsible, however, and this may occur at any time with the liquid vaccines as placed on the market. This is the settling of the bacilli to some dependent point in the tube owing to the fact that the anthrax spores are of a greater specific gravity than the liquid in which they are dispensed. I have had tubes in which the bacilli would settle to some point and it would be impossible to get them into suspension. This is particularly the case when sealed glass ampoules are used and the gravitation has taken place to the pointed end. In such cases, unless great care is taken the potent portion of the vaccine is broken off with the end of the ampoule and your animal gets the culture fluid with little or no vaccine.

When the foregoing accident happens with the first vaccine it is easily seen that we have not introduced a sufficient amount to protect the animal against the second or stronger vaccine. If the first is properly administered and the accident happens with the second vaccine we have an incomplete protection and a false

sense of security that our operations will be effective in protecting the animals concerned.

Another feature in connection with the liquid vaccine which concerns the laboratory worker only, is, the difficulty in preparation and meeting emergencies when a large amount of vaccine is required. Where liquid vaccines are dispensed by the laboratory it is necessary to have cultures of the first and second vaccines not over a week old. Older cultures may give satisfactory results, but, with the danger of contamination existing and the possibility of varying factors or accidents increasing the virulence of the attenuation, there is a constant risk in such methods. Liquid vaccines cannot be tested except bacteriologically, for every disbursement, hence, there is this constant uncertainty. When cultures must be prepared every week the detail is usually delegated to some laboratory subordinate who should never be trusted with such work.

Having had experience with the various features connected with the use in the field of anthrax vaccine and later being charged with the responsibility of maintaining the potency of the anthrax vaccine disbursed by the Dominion Government, I conducted various experiments to determine the possibility of using some method other than the liquid culture for the attenuated virus. The preliminary experiments which extended over a period of a year were successful and resulted in the use of a package previously designed for the disbursement of black-leg vaccine.

Properly attenuated organisms were dried on braided silk and experiments conducted to determine their protective power. For this work sheep were used. The sheep were tagged and the first vaccine administered. Twelve days were allowed to lapse between the administration of the first and the second vaccines, and a further period of twelve days was allowed between the time of administration of the second vaccine and virulent anthrax. To a "control" sheep inoculation with a thread of virulent anthrax resulted in death within forty-eight hours, while all vaccinated sheep remained healthy. In these experiments it was determined that the size of the dose of vaccine does not bear a direct

relationship to protection. The administration of a single thread of each vaccine gave an efficient protection against a thread impregnated with virulent anthrax. Six threads of each also conferred an immunity, yet did not result in a severe systemic disturbance.

Anthrax vaccine has been disbursed by us on a dry silk cord for a period of five years, and has been used on horses, cattle and sheep without the single report of an accident following its use. During the past year one of my assistants, Dr. Evans, had the opportunity to use this vaccine on some experimental sheep among which anthrax had appeared, with the result that 247 sheep weighed 23,927 pounds immediately prior to the administration of the first vaccine, and two days after the administration of the second vaccine weighed 25,115 pounds. This gain in weight (2,673 pounds) was similar to that shown throughout the experiment for which they were being used.

There are many features in favor of the use of properly attenuated cultures dried on threads which do not hold for a vaccine disbursed in liquid form. Our experiments show that vaccine prepared in this manner is still potent after a period of six years. It may be prepared in large quantities by a properly qualified technical officer in amounts sufficient to meet all requirements.

The advantage to the user is that he has a vaccine ready for use without the necessity for laborious shaking and he is certain that with the introduction of the thread beneath the skin the entire dose is given to the animal and no animal is given too large or too small a dose. Protection is thus assured against the administration of the second vaccine, and with the administration of the second vaccine, protection afforded against virulent anthrax.

The laboratory worker can produce sufficient at one time to warrant elaborate testing out on sheep or cattle which would be impossible with a liquid vaccine fresh grown every week.

In closing my remarks on anthrax vaccine I may state that I have purposely omitted mentioning killed cultures of the anthrax

organism. I believe that if we are going to destroy the vitality of our cultures before vaccinating we might just as well use some innocuous germ which we know will afford protection against anthrax for a varying period. Other points of interest have not been dealt with as the time at my disposal is limited and published data is available for those who care to go more fully into the subject.

HANSOM CABS AND OTHER CARRIAGES RETURNING IN NEW YORK.—The following clipping from the New York *Evening World* and comment upon it, was extracted from a recent issue of the *Rider and Driver*; and, as it contains plain statements of facts, should be interesting and encouraging to veterinarians:

"In Fifth avenue and on Riverside drive, too, was a queer reversion to type. It was the return of the hansom cab.

"Nobody knows from where the old two-wheelers came. But it is true that there were more two-wheelers than taxis in the main up-and-down streets and the Riverside drive yesterday from noon until the yellow-and-wet dust simoon began.—*Evening World's* Report of a Sunday Parade.

"As our readers have been informed, the hansom cab has 'come back' for every day use both as a private and a public vehicle and is especially popular 'by the hour' for shopping and calling within limited zones. It is comfortable, airy and a pleasurable lookout. Now, not only the hansom, but all horse-drawn vehicles, are returning to the streets in daily increasing number. A few months ago gigs, broughams, phaetons, runabouts and similar traps were a drug in the market; at the Durland sale last spring they went off 'like hot cakes' at surprising high figures, which were in excess of more than half their original value. For example, Mrs. Bowen's miniature coach was sold to Mr. H. C. Jackson for \$1,300. A lady's park phaeton brought \$560, a gig \$205, a runabout \$215 and a top buggy \$260. Carriage builders and dealers like Studebaker, Fiss, Doerr & Carroll and Van Tassell & Kearney report equally good prices and a demand greater than the supply * * *."

DR. R. C. LONGFELLOW, Toledo, paid us a flying visit on his return from Washington, D. C., the last week in September, and brought greetings from our brothers in the Buckeye state.

EQUINE DISTEMPER.

BY WALTER LINCOLN BELL, D.V.S., BROOKLYN, N. Y.

This disease, though known under many different names, as Influenza, Shipping Fever, Green Sickness, Stock-yard Fever, Pink Eye, etc., could very appropriately be termed as "Horse Plague," as it is in reality, the most serious factor to be considered in relation to the production and sale of horses. It has been known from the earliest times and veterinary literature contains many writings of this disease, though nowhere that I can find is the important fact considered that this, as "La Grippe" in humans, is but a primary condition and is in itself rarely fatal, but so debilitates the system that a secondary invader obtains a strong hold and in the case of full blooded plethoric horses, fed up for market, the tissues are in a very receptive condition for the rapid development of these secondary conditions, also if the history of the method, by which a horse finally reaches the market, is considered, it is as follows:

Purchased from the farmer, transferred to a feeding point, kept confined and heavily fed on easily assimilated fat-producing food, then shipped to a near market; so far passing through two centers of infection, from which the horse is shipped to a market farther East, and may in fact go through three or four of these sales before reaching the sales stable where purchased for use.

Each one of these markets is an active source of infection as well as each step of railroad transportation.

The development of fever at any point is temporarily combatted by means of strong febrifuges and the animal sent on to receive the same treatment as necessary. The result is that when the horse reaches the final market, he is not only well advanced in the basic original disease of distemper, but through excitement and exposure of transportation offers a fertile field for rapid development of any of the secondary invaders which may vary

in successive years, also the virulency of these invaders varies with different shipping seasons, which virulency has tended to be greater each successive fall, winter and spring, for the past three or four years, until the season just passed has probably seen a greater loss from distemper and its sequel than for many years. This can be accounted for in several ways, one is that draught and delivery horses are bought from raiser at a younger and more susceptible age; as before mentioned sent through several markets before received by final dealers, and also to the indiscriminate injection of experimental preventive serums, etc., and lastly to the fact that as in all contagious or infective conditions, the tendency is for successive outbreaks to assume a more severe type until the virus is attenuated, after which the cases become milder for a period, then again more severe.

As I before pointed out, distemper itself is rarely fatal, but the initial debility and depression caused is so intense that a secondary invader is readily received, tissues saturated, and unless animal has an individual immunity or great resistance, results are apt to be fatal. These facts being true, the real success is therefore in producing an immunity not only to distemper, but to the secondary micro-organisms. The difficulty heretofore has been that until now the organism causing distemper has never before been isolated and known.

January, 1911, Professor Wm. Lintz, M.D., Long Island City Hospital, N. Y., became interested from a bacteriological standpoint in an outbreak of distemper among horses of what was then Squadron "C" (now 2d Cavalry Regiment, N. G.), which manifested itself shortly after return of tour of duty at Pine Camp, N. Y., and which was causing us a very severe loss, as our mounts are purchased and fed privately without assistance from State or National Government. This outbreak commenced September, 1910, with three light cases followed at short intervals by more and more aggravated cases until the total number of afflicted animals was thirty, of which fourteen died, though all indicated forms of medicinal treatment were thoroughly tried, and the advice of Professor V. A. Moore, Cornell University,

Dr. Frank H. Miller, New York City, as well as several laboratories locally; but we received no material assistance until Dr. Lintz became interested in the outbreak, solely from a scientific standpoint.

From Lieder Krantz, a morgan stallion, used for our Remount Stud, Dr. Lintz isolated a bacilli (since called *Bacilli Lintz*) of the colon group that proved the specific cause as well as pneumococci, which he found was the secondary invader and cause of mortality.

This vaccine was used on three typical cases, one in the primary phase of distemper (Wright horse), one in secondary phase or pneumococcic infection, well advanced (Backhouse horse), and one in the third, and what had been always fatal phase in this outbreak (Painter horse).

The Wright horse received one vaccination of the vaccine. This with mild stimulant was only treatment administered.

The Backhouse horse had several complications, most serious of which was nephritis, Hexamethylenamine (Urotropine) was given for several days. This horse received four vaccinations in a period of about fourteen days, after which time the temperature had returned to normal and general condition so improved that no further medication was administered.

The Painter horse showed all indications of all the tissues being seriously invaded; temperature. The improvement noted in these three cases was so marked that we were positive that the specific organism has been isolated and in accordance Dr. Lintz prepared an immunizing vaccine of a reduced number of *Bacilli Lintz*. Ten horses were of different physical condition, temperature and pulse every four hours were taken, one day after which we inoculated them with above vaccine. The reactions were very similar to that of mallein and three of the horses showed considerable systemic disturbance, temperature rising to 105 and 106, increased pulsation, depression and anorexia, and in general typical characteristics of the disease, two of the reactors returned to normal condition in two days, and the third one received a curative inoculation the third, and was normal the

sixth, subsequent to the original immunizing. These results being so marked, we decided to immunize the balance of our mounts, about 82, and accordingly they received the same inoculation as the ten test horses; showing quite some reaction of about eight per cent. of the horses. The balance was very slight, if any at all. These reactors were given mild stimulants and all returned to normal within a few days after passing through a mild typical course of the disease. This absolutely checked this outbreak, and there were no more cases.

Eleven months after (December, 1911), a new outbreak started amongst some of the horses that had not been in the armory during the original trouble, and many of these horses were attacked very severely. These were immediately inoculated with the curative dose, and though there was a total of 35 cases, we had no fatalities, as before all other horses were immunized, and though the outbreak started about December 7, 1911, every case was successfully terminated, all other animals being immunized, and we were entirely through with this outbreak December 28, 1911, and every animal in good condition. No other treatment was used, aside from intestinal antiseptics and mild heart stimulants in the more severe cases.

Upon finding that we were contending with a form of distemper or shipping fever, I furnished some vaccine to Dr. Frank H. Wright for use in cases of usual form of distemper occurring in "Green Horses." The results were so satisfactory that he immediately adopted the procedure of treating all horses green purchased, by his clients, immunizing those not showing fever, and treating with curative vaccine the ones showing infection. His results were as follows:

In fifty cases occurring during November and December, 1911, in one stable, not treated with Vaccine Equina-Lintz, fourteen died. In forty-eight cases in the same stable during March and April, 1912, with Vaccine Equina-Lintz, one died, which through carelessness became exposed to cold and died of enteritis, as all these ninety-eight occurred in one stable, the test seemed conclusive.

Dr. Philip Weaver, Glen Cove, L. I., was supplied with this vaccine to treat a carload of horses, of which all were sick, having several dead in transit. His conclusions were that it was absolutely specific for distemper in its various phases. Though having given up general practice to specialize the treatment of pets, the success of our treatment of horses at our Armory became known, and I have been called upon several times to investigate and treat distemper in some of the large stables locally, of which an outbreak occurring in the horses of the Borough Development Company, January, 1911, was very interesting. There were seventy-two horses in the stables, one horse having died the day I made the original investigation. Four cases had already resulted fatally. Dr. Lintz naturally being interested in the case directed the autopsy, and took necessary material for culture and examination. His results were that the identical organism was easily recovered and pneumococcus here also proved the secondary invader and cause of fatality. They were of an exceptionally fine type of heavy draught horses. I treated fourteen cases, most of them of very serious phase, immunized the others and terminated the outbreak in about three weeks with no deaths and every horse ready for service.

One of the largest contracting concerns purchased eighty horses this spring. These horses approximated \$500 each and were the pick of the market. Twenty had already died when I was called on, one of which died the following day, and from this autopsy Dr. Lintz recovered the original bacilli (Lintz) as well as pneumo and streptococci, and accordingly prepared an autogenous vaccine which was used after the third day. The initial vaccinations having been made with organisms from original outbreaks which have been kept growing and of full potency by passing through laboratory animals. Two were dying and there was a total of thirty severe cases for treatment. The two died the following day. One was so intensely saturated that I only injected very small numbers of organisms each day and though the animal showed considerable improvement, he died the sixth day. The remaining thirty horses were successfully treated and all horses returned to normal in nine days.

One of the local sales stables became interested in the vaccine during May of this year, and the results were so conclusive that they adopted it as their standard treatment, having lost but one horse, which, during convalescence, was put in a draughty place and a severe congestive condition developed, and the animal died the following day from intense endocarditis. Since initial use in May, 1912, this stable has treated a large number of cases. Many were severe and this was the only death. The results have been practically the same in one of the largest as well as the majority of smaller sales stables in New York City, and also in the practice of many of the veterinarians in the Greater City.

There can be no doubt as to the fact that Dr. Lintz has succeeded in isolating the specific organism causing equine distemper; not only are the above facts conclusive, but complete research work has been done and the following are the results: Agglutination reactions with the serum of sick as well as those that had recovered were positive; agglutination was still present in a dilution of 1-200. It is pathogenic for mice, rats, rabbits and guinea-pigs. Upon autopsy these animals showed marked parenchymatous degeneration of all the viscera, and the same organism was isolated. It is not pathogenic for dogs.

A horse was secured and this organism was inoculated both subcutaneously and intravenously. This horse was under the constant observation of Dr. Tiersen, a former Veterinary Captain of the French Army. Twenty-four hours after the intravenous inoculation of a saline emulsion of six agar culture tubes, which tubes had been inoculated with the Bacilli Lintz and incubated for eighteen hours, the horse's temperature rose abruptly to 105. He refused all nourishment and exhibited signs of marked weakness and constipation. The temperature for the next three days fluctuated between 103 and 106, gradually returning to normal at the end of five days. The cardinal symptoms of the disease, namely, hyperpyrexia, slow pulse, anorexia, weakness and constipation, were reproduced in the experimental animal.

Further proof is also found in the fact that we have also been able to control and stop severe outbreaks in stables contain-

ing a large number of horses. In these instances a vaccine of Bacilli Lintz only was used, and such immunization held perfectly.

It would be unnecessary to go into a lengthy description of symptoms etc., of this condition, as we are all familiar enough with it in its various manifestations, but the cardinal symptoms as I have observed them in two years' experimental work, covering many cases, are, first, high temperature with little pneumonitory symptoms; second, anorexia, often complete, constipation third; intense depression and weakness fourth; and to my mind an important feature is that the temperature may be as high as 107 degrees Fahrenheit, yet the pulse will be only about 60 and strong. This covers the primary phase or distemper proper, and lasts from three to five days, gradually subsiding to normal for one to three days when the animal becomes again very sick, temperature high, then fluctuating, showing septic invasion, pulse higher and weaker, breathing indicates lung involvement, weakness exaggerated, anorexia complete and unless animal possesses strong immunity and resistance, death occurs. This is due to the secondary invader, which is pneumococci in the majority of cases, but may also be complicated with streptococci.

VETERINARIAN ASSISTS MEDICAL MEN REPORTING IMPORTANT CASES.—We have had the privilege of perusing the *Australasian Medical Gazette* for April, 1910, and also for April, 1911, and we find in the former a report of a case of "Bilateral Tubal Pregnancy with Rupture on Either Side," by T. G. Wilson, M.D., Gynæcologist to Adelaide Hospital, in which Veterinary Surgeon Desmond, of Adelaide, prepared the specimens and microscopic sections, photographs of which, and of the two pregnant tubes, taken by Desmond, are used to illustrate the article. In the 1911 number, we find a most interesting report of a very unusual condition (to the veterinary mind at least) of a tumor at the base of the brain in a woman, causing Acromegally. This case, in which Veterinary Surgeon Desmond photographed sections of the brain that are used to illustrate the article, presents such interesting symptoms that we shall reproduce it in whole or in part in a future issue. It is men like Desmond that do much to amalgamate the two branches of medicine and surgery.

VETERINARY EDUCATION COMES INTO ITS OWN IN THE WEST.*

BY F. W. BECKMAN, AMES, IA.

Veterinary education is coming into its own in the mid-west with the completion of the new \$200,000 set of buildings for the veterinary school at Iowa State College at Ames. When Dean C. H. Stange and his associates open the fall term's work in the new structure, they will be housed in the largest and most complete institution of its kind in this country or any other.



Dr. Charles H. Stange,
Dean of the Veterinary Medical School.

A good many new ideas have been worked out in the arrangement of the Iowa veterinary buildings. Each of the departments has been given a separate building so that its work may go on without interference from other departments. Yet they are brought closely together by a covered passageway that connects all of the buildings, both main floors and basements. With this arrangement, the head of each department can be fixed definitely with responsibility for what goes on in his department, thus facilitating administration. The buildings with their connecting

*This story is furnished with the compliments of Iowa State College.

passageways surround a large inner court which makes possible perfect lighting and ventilation, always so important in veterinary college buildings. Every structure is lighted from all four sides and laboratories and dissecting rooms have an abundance of light and fresh air. The whole set of buildings occupies a space 339 feet by 256 feet in size, the equivalent of a full city block.

There are five buildings in the entire group, three at the front and two at the rear. Sometime later a sixth building will be added at the rear to house the research and experimental work of the college. When this extra wing is completed, another \$40,000 will have been invested by the state. At the center of the

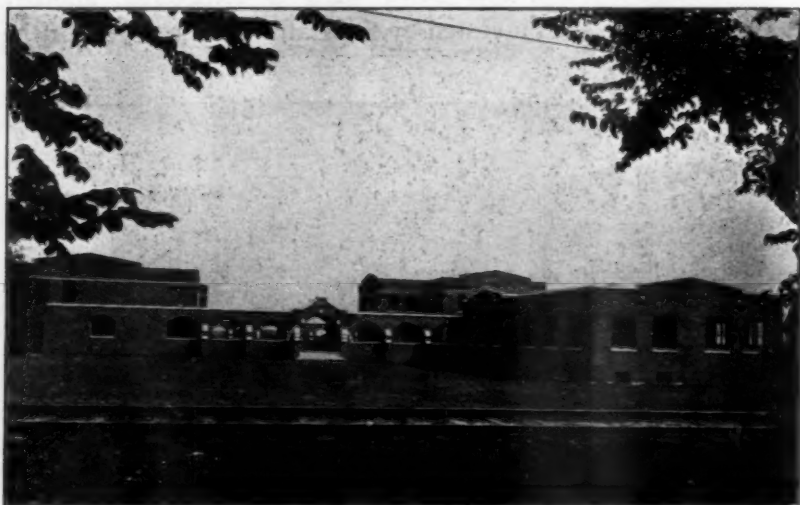


A view of the front of the new veterinary buildings at Iowa State College showing the administration building at the center and the pathology and bacteriology laboratory at the farther side and physiology laboratory at the near side.

three buildings in front is the administration building, which contains the general offices, the library, an assembly room that seats 200, a large general museum and faculty rooms. On one side of this central building is the pathology and bacteriology building, and, on the other, a building devoted to the physiology laboratories and the pharmacy class rooms. The laboratories in both structures have complete and modern equipment. In this respect they rival the best of college laboratories in the country. Especially interesting is the animal physiology laboratory. It is the most complete to be found in a veterinary college in this country. It represents the last word in this branch of veterinary sci-

ence, which is only now getting its rightful recognition as a part of veterinary education.

At the rear stands the large clinic and hospital building, 163 feet by 61 feet, and the anatomy building. In the hospital building there is capacity for 70 patients, including kennels for 22 dogs and other small animals. There is, also, an isolation ward for the treatment of contagious diseases. Throughout, this hospital building is constructed of brick, cement and steel, and every nook and corner of it may be thoroughly cleansed and disinfected.



A view of the veterinary buildings at Iowa State College from the south side showing the inner court and the connecting corridors.

Every stall is equipped with slings. There are three operating rooms in this structure. The largest, 65 feet by 30 feet, opens into the inner court. This is used for the examination of animals as they are admitted and for minor operations and treatments. Adjoining it is a clinical amphitheatre and next to that is the third operating room for large animals, equipped with a hydraulic operating table. Near by is a dispensary and instrument room and off of that the office and living apartments of the house surgeon. Throughout this hospital building is equipped with white enamel and glass instrument cases, operating tables

and basins, while the small animal operating room looks for all the world like an operating room for humans.

The anatomy building contains perhaps the best lighted and the most complete animal dissecting room in the country, besides an unusually large amphitheatre class room where animal carcasses may be brought for special dissection. The dissecting room is as far different from the usual veterinary dissection room



Instrument room and dispensary of the veterinary buildings at Iowa State College.

as may be imagined. Not many medical colleges can boast better facilities for their work.

Iowa has been generous with its veterinary school for several reasons, chiefly perhaps because Iowa is a great live stock state. Dean Stange estimates that the value of all kinds of animals in Iowa at the present time is not less than \$450,000,000. He estimates, further, that there is an annual loss of live stock from preventable disease amounting to \$10,000,000 at least. These facts are responsible for the building of a school to train veteri-

nary doctors that measures up to the need. Dean Stange had another purpose in securing a building that some visitors say is good enough for the care and treatment of human beings. That purpose was to give the young men who attend Iowa's veterinary school a proper idea of the dignity and importance of their work. Unconsciously, the splendid building, with its fine equipment and its strict cleanliness, must teach veterinary students that their work is worth while, that its standards should be high, that it should be dignified, that it should command the best kind of men and that it should get the very best service from them.

Many veterinarians have visited the new buildings and they are unanimous in their praise of it. Dr. A. M. Farrington, assistant chief of the Bureau of Animal Industry at Washington, said that he thought that the building stood for the very best ideals in medicine. He added that if Iowa did not graduate a new and better type of veterinarians, he would be much disappointed.

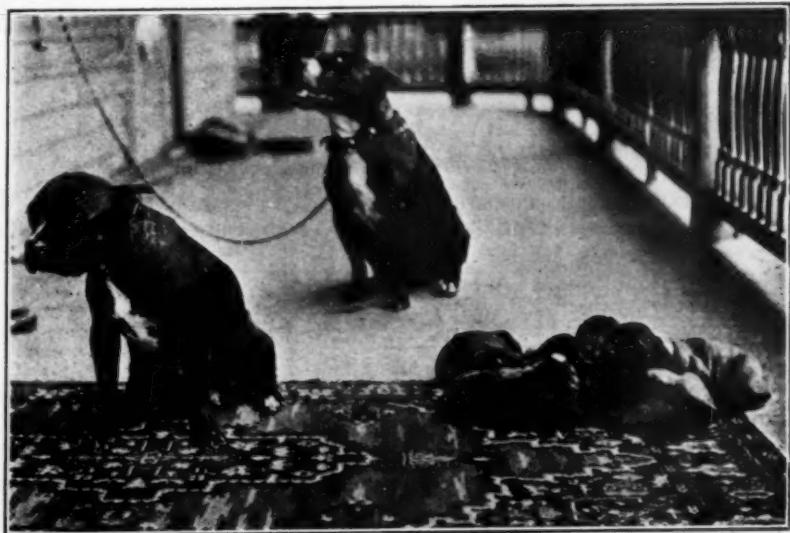
A CORRECTION AND A REQUEST.—Under the caption, "THE VETERINARIAN IN RELATION TO PUBLIC HEALTH," a paper was presented to the Veterinary Medical Association of New Jersey in July, 1912, by Percival K. Nichols (veterinarian to the New York City Board of Health for the Borough of Richmond, and also to the New York State Department of Agriculture in Richmond County), and was published in the September number of the AMERICAN VETERINARY REVIEW, beginning page 682, giving as its author, Harold E. Stearns, Arlington, N. J. This error occurred through Dr. Nichols' paper being received without bearing his name on any part of it, and the fact that Dr. Stearns also presented a paper at the same meeting bearing the same title; so in looking over the program to find an author to fit the title of Dr. Nichols' paper, Dr. Stearns' name was erroneously appended. We therefore ask each individual reader to make the correction in his September number by drawing a line through Dr. Stearns' name and address and supplying that of *Percival K. Nichols, D. V. S., Port Richmond, N. Y.* Kindly do this now, lest you forget.

REPORTS OF CASES.

CESARIAN SECTION.

By W. E. NEIL, D.V.S., Kirksville, Mo.

On the tenth of June I was called to see a Boston bull terrier that was due to whelp. I was told by the owner that she had taken sick the day before. She was laboring, but the pains were of short duration, and far between. There was no delivery yet made. But on examination, I was able to feel the top of the head of one puppy; and by manipulation, the head was raised, and in a few minutes there was a delivery. So I left the patient in the care of the owner, and told him, I thought that she might give birth to the remainder without assistance. But at two o'clock I was called, and found there was no progress made. Upon examination I found there two puppies presented as far as the ilium of the mother would permit. These puppies had their heads hooked over each other's neck, and when she would labor they



would both present at the same time. So I was unable to get them separated, she being too small to use instruments, as this was her first time to whelp. So about 6 p. m. I prepared to operate. She was placed on the operating table, the field for operation was shaved and cleansed, and she was given ether until

completely anesthetized. A bold incision was made in her left side, absorbent cotton was placed around the opening, the horns of the uterus containing the foetuses were brought out and laid on the absorbent cotton, an incision was made in the horn, on the upper side extending to the body of the uterus. The foetuses were removed from both horns by the same opening. There were eight alive and one dead. After removing the contents of the uterus, the opening was sutured up with sterile catgut, turning the serous surfaces together, making the Lembert stitch. The organ was then replaced and the abdominal peritoneum sutured with catgut, the muscular structures and skin with linen tape. The parts were dressed with iodoform, flexible collodion, the parts covered with absorbent cotton, and a many-tailed bandage applied. She came from under the anesthetic in about thirty minutes, was given strong coffee in small quantities every hour during the night. Was irrigated the following day with a 5 per cent. boracic acid solution, and was given liquid food for a few days. She made a nice recovery, and six of the puppies are still living, but three died for lack of nourishment. The mother and puppies are healthy, as you can see by the picture. There was no supuration and the stitches were removed in four days and left scarcely a mark or scar.

A DIVIDED PALATE.

By FRED W. PORTER, D.V.M., Tampa, Fla.

I am inclosing a photo print of a calf's head that was recently delivered by me. I have the original preserved in formaline.



It is a complete specimen of divided palate (palatognathus). The print shows the view, looking directly into the mouth. The fig. 1 is the tongue; fig. 2, the turbinates; fig. 3, the nostrils, six inches apart; fig. 4, eyes, lids formed but not opened.

Cow had been in labor some hours when I was called. Examination showed a cross presentation with all four feet at the inner os. Tried to deliver by head and fore feet, but of course was unsuccessful; I could feel something that felt like a nose but incomplete. Turned foetus and made a breech presentation without serious difficulty. Had an astonished owner when that head came in sight. Think it unusual enough to send you a report of it.

A CASE OF EARLY MATERNITY.

By A. N. TOWNER, D.V.S., Brewster, N. Y.

The accompanying picture, is of a heifer that gave birth to a live calf (calf is still living and doing well) when she was but one year and three days old. To me this was rather unusual, as I had never seen or heard of one "coming in" so young.



This calf was kept in a pen all winter with three or four others and fed milk. This spring she was turned out and in a short time showed that she was "making bag." The owner did not think anything of this until one morning on going to the pasture to salt the dry stock, he found the heifer with a calf at her side.

ABSTRACTS FROM EXCHANGES.

ENGLISH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

OBSCURE CAUSE OF DEATH IN A PONY [*Thos. A. Huband, F.R.C.V.S.*].—Pedigree yearling pony showed symptoms of sub-acute abdominal pains and treated accordingly; castor oil, colodyne in warm milk. The pains were relieved, but death took place within 35 hours. At post mortem no abnormal conditions were found except that the mucous membrane of the colon was ulcerated. The lesions were in outline somewhat ovoid, varying from one-third to one-twelfth of an inch in size. No perforation could be found. This condition was considered as due to *bacillus necrosis*.—(*Vet. Record.*)

FRACTURE OF THE OSPEDIS [*J. F. Macdonald, M.R.C.V.S.*].—Roan van mare, six years of age, makes a false step while at work and is lame on the near hind leg. The next morning she is in great pain and unable to carry weight on that leg. The foot examined revealed tenderness about one inch in front of the point of the frog. One or two days later pus is found, followed by sloughing of sensitive laminae. The discharge lasted for some time, but had odor of caries. Eventually the animal got well except being lame with low ring bone. Left at rest the mare was, after three months, able to do her work. She died six months later from rupture of the heart. The photo which illustrates the record shows that the fracture extended from one of the articular glenoidal cavity of the upper face of the ospedis and extended all through the thickness to the inferior face.—(*Vet. Rec.*)

HEART DISEASE CAUSES PARALYSIS IN A DOG [*J. R. Hodgkins, Capt. A.V.C.*].—Ten-year-old terrier has just left his owner well and bright and an hour and half after he is sick, unable to stand and drags his hind quarters. A purge is given. The author sees him three days later and finds him completely paralyzed from the 11th dorsal vertebra back. Pulse is slow and regular. Temperature 101°F. Urine drips slow and easily evacuated by pressure. The dog is destroyed. Heart, spinal cord and prostate

gland are the only seats of lesions; pericardium normal; left myocardium showed light buff colored spot which extends through the thickness of the ventricle. Mitral valves inflamed, thickened and with granulations, one is as large as a horse bean. Tricuspid valve also diseased, but more extensively. The aortic valves are only inflamed. Spinal cord had its vessels extremely injected. The cord was soft and pulpy, the posterior part almost creamy in consistency. Portion of the lumbar cord was considerably inflamed. The prostate gland was enlarged.—(*Vet. Record.*)

SEPARATION OF COLON AND RECTUM IN A MARE [*Mr. C. G. Hill, M.R.C.V.S.*].—This case was reported at the Veterinary Association of South Durham and North Yorkshire.

The mare foals and seemed all right until the next day, when she showed little pain. She had not passed feces and except a small tear on the vagina she seemed all right. "On passing his hand into the rectum the writer entered a large sac and it was with much difficulty that he found the entrance of the floating colon. When he had passed his hand through the opening it closed upon it, and in withdrawing his arm the bowel closed tightly round his wrist and was drawn out through the anus" when it was liberated back. The mucous coat of the bowel was deep purple in colour. The mare lived for a week, had no great pain, ate some mash and grass. At the post mortem all the organs were found healthy except the colon and rectum were separated from each other; the ends of the bowels were gangrenous. It was thought that the mare when straining at the time of foaling had caused an intussusception and as time had gone on sloughing had taken place at that part.—(*Veter. Record.*)

RECURRENT UMBILICAL HERNIA WITH CHRONIC PNEUMONIA [*J. J. O'Connor, M.R.C.V.S.*].—Eighteen-months-old thoroughbred colt had congenital umbilical hernia, for which he was operated by Degive's method. Through neglect from the owner in following advice about diet and hygiene of the colt, the hernia returned and then the ring was large enough to admit the insertion of both hands. *Treatment*: Anesthesia, aseptic and antiseptic precautions taken, hernial sac is open, the left hand in the abdomen keeps bowels in, insertion of Halstead's sutures through the edges of the ring with pledgets of gauze to prevent great tension on the sutures, another series of same sutures inserted through the neck of the sac, iodoform and bandage dressing

round the body. For the first 13 days temperature of the colt varied between 104° and 105° F. On the 19th day appearance of improvement. Temperature 103° . On the 21st day it went up again and then varied up to the time of death, which occurred some two weeks later.

At the post mortem typical lesions of chronic pneumonia was revealed with local peritonitis having caused adhesion of the cæcum to the abdominal wall and to a portion of the ileum. — (*Vet. Journal.*)

INTRODUCTION OF AIR INTO THE JUGULAR [*Frank Chambers, M.R.C.V.S.*].—Record of three experiments made by the author upon three head of cattle, which were diseased with East Coast fever. The first received a first intravenous injection of air, 100 c.c. when the respirations increased from 38 to 58 a minute and to 61 after injections of 400 c.c. This cow received 2346 c.c. of air and died in 12 minutes.

In the second case 100 c.c. increased the respiration to 58 and afterwards receiving 500 c.c., they run up to 105. It took 2500 c.c. of air over a period of four and a half minutes to cause death.

The third animal was a cow, in which the injection was administered quickly and where death required 3000 c.c. of air before it occurred.—(*Vet. Journ.*)

SEPTIC METRITIS IN A BITCH [*R. Branford, Punjab Vet. College*].—Bitch is in a state of collapse. She had four puppies seventeen days before and a fifth had to be taken away from her. She had appeared well ever since, but was suddenly taken sick and rapidly grew worse until she is in the state mentioned. Uterus is washed and relieved of all its infecting contents and repeated injections of chinisol are prescribed. The body is wrapped in flannel wrung out with hot water. The temperature which had been up to 109° 4F, dropped the next day to 107° , to 102° , to 101° and finally, with quinine, little beef extract, milk, the animal recovered. The interest of the case rests on the sudden onset of the symptoms of intoxication so late after pupping and the very high temperature.—(*Vet. Journ.*)

SARCOMA OF THE SMALL INTESTINE [*E. Clive Webb, F.R.C.V.S., Captain A.V.C.*].—This grey mare, aged 7 years, has for the last six months, up to the date of death, been suffering with frequent attacks of colics. She was very poor in condition

and her appetite capricious. Her abdominal pains were sub-acute and dull, being manifested by constant lying down, pawing, etc. Constipation was not a marked feature, and towards the end the colics had become more violent. Rectal examinations, renewed several times, revealed nothing which could help in making a diagnosis. Tuberculine test was also negative. At the post mortem, the body was found extremely emaciated and on opening the abdomen a large solid tumor was detected "incorporated with the bowel wall about the junction of the jejunum and ileum. On section, it was found that the lumen of the bowel actually penetrated the centre of the solid-looking fibrous mass, which was the size of a cocoanut." Examined with the microscope, it was pronounced round-celled sarcoma.

There was also a stricture of the small intestine, not sufficient enough, however, to interfere with the passage of its contents.—(*Vet. News.*)

FRENCH REVIEW.

By Prof. A. LIAUTARD, M.D., V.M.

PERICARDITIS IN THE HORSE [*Mr. Bouquet*].—Cryptorchid, this horse is operated. One testicle only is apparent, and removed by covered operation. The other is deep in the inguinal region and is taken off with the emasculator, after catgut ligature of the cord. Slight hemorrhage takes place the next day and is easily controlled. The horse is doing well and ten days after is moved to another stable, where he is alone. Three days after he roars a little, refuses his food and has spells of dyspnea. His temperature is $39^{\circ} 5C$, respiration 32. There is a slight puffing of the head about the supra orbital depressions. Sore throat is diagnosed and proper treatment prescribed. The next day the animal is much worse and dies before the writer gets there. Post mortem made immediately shows that the operation of castration has nothing to do as cause of death. The thorax open, explained it. The pericardium contains about 15 litres of serosity, and while its internal face is covered with ecchymoses, there is adherence of its external face with the left pleurea. This is quite strong and formed of fibrous tissue slightly gelatinous and easily torn. The trouble was probably of old standing and possibly might have been relieved, if diagnosed.—(*Rec. de Med. Vet.*)

ACUTE STOMACAL DILATATION IN DOG [*Mr. L. Naudin*].—Concise note to call the attention to a lesion generally overlooked

and noted by the author only twice at post mortem of adult dogs. In both cases the conditions were exactly alike. Dog in perfect health is taken, shortly after meal, with sudden illness, shortness of actions, arrest, suffocation, death—all in about 10 minutes—nothing can be attributed as the cause of this rapid fatal ending. Post mortem made a few hours after death shows excessive swelling of the whole cadaver, thoracic viscera show all the lesions of asphyxia, heart in diastole is filled with black, unclotted blood. Opening of the abdomen exhibits a pushing forward of the diaphragm muscle by the stomach, enormously distended by gases. The duodenum is filled also. There is no displacement of organ nor any strangulation anywhere. Nothing, in fact, except an acute, idiopathic dilatation of the stomach, very different from the torsion of that organ.—(*Rev. Gen. de Med. Vet.*)

ALCOHOLIC ACUTE INTOXICATION IN A COW [*Mr. Leduc*].—The cow is lying down in an abnormal attitude. She moves about in an automatic manner every two minutes and moaning in a peculiar manner, and these correspond to jerky expirations. The respiration is accelerated and interrupted now and then. The pulse is irregular, the eyes twisted in the orbits, there is no defecation nor micturition. The temperature is normal. It is completely impossible to make the animal get up. In the presence of such severe symptoms and fearing an encephalic or meningeal affection the owner has the cow slaughtered. At the autopsy were found congestion of both lungs, with apoplectic spots in some lobules. The liver and spleen are enormous and when cut through leave escape to very red serosity. Rumen and other stomachs contain food having a very strong alcoholic odor. The small intestine has the same odor. A careful inquiry gives the information that, left loose in a farm yard, the cow had drunk from a barrel about 12 litres of the distillation of cider recently made.—(*La Presse Veter.*)

COMMUNUTED FRACTURE OF A RIB IN A MARE [*Mr. Vignard, Army Veterinarian*].—Surprised stealing oats after getting loose from her stall, the mare runs through a door and receives a deep wound by a hook, about its middle of the right costal region. The skin is torn, about 40 centimeters in length, and the panniculus, serratus magnus and external intercostal muscles are involved in the tear. The 10th, 11th, 12th and 13th ribs are exposed and from the 12th a splinter is torn from the outer surface, measuring 12 centimeters in length. The spongy substance is exposed

and yet there is no transversal solution of continuity. The pleural cavity remains protected only by the thin layer of the intercostal muscles. After, as thorough disinfection as possible and removal of some loose splinters of bones and of the loose soft tissues, the wound was closed with stitches, except over the central portion to leave the 12th rib exposed. Boric acid dressings were prescribed and with antiseptic injections; the wound gradually healed in due time, the mare resuming work after a month.—(*Rev. Veter.*)

NITRATE OF PILOCARPINE IN TETANUS [*MM. Remond and Aouizerate*].—Record of two cases which were treated with success after other treatment seemed to fail and fatal end looked for.

The first case was in an eight-year-old horse which, after a superficial wound of the croup, showed marked symptoms of tetanus. These progressed rapidly and the owner was considering the propriety of killing him when injections of nitrate of pilocarpine were suggested. During four days the animal was kept in a dark stable and received repeated injections of pilocarpine. Improvement soon was manifested and after a long convalescence the horse resumed work.

The second case was more severe in its development. Following a suppurative arthritis of the left stifle joint, he was submitted first to injections of tetanic serum, but as this did not seem to arrest the disease, sub-cutaneous injections of pilocarpine was resorted to and after eight days of treatment the animal was considered out of danger.—(*Bullet. de la Soc. Cent.*)

TUBERCULOSIS OF THE SUPERRENAL CAPSULAE IN BOVINES [*Mr. P. Chaussée, Vet. Inspect.*].—Similar cases are very exceptionally observed. A cow six years old, very thin, without muscular atrophy, presented lesions of tuberculosis of its lungs well marked and hematogenous ones in small numbers. The renal regions were covered with abundant vegetations and one of the suprarenal capsulae, weighing 25 grams, contained a big caseous tubercle. The other capsule was more diseased, weighed 160 grams, and was also caseous.

Again, in a five-year-old steer, having generalized tuberculosis, without peritoneal lesions, there was on the left gland two caseous tubercles, entirely similar to those of the other tissues, developed in the medullary substance of the gland, while the cortical portion was free.—(*Bullet. de la Soc. Cent.*)

BIBLIOGRAPHY.

PRINCIPLES OF MICROBIOLOGY.

PRINCIPLES OF MICROBIOLOGY. A Treatise on Bacteria, Fungi and Protozoa Pathogenic for Domesticated Animals, by Veranus Alva Moore, B.S., M.D., V.M.D., Professor of Comparative Pathology, Bacteriology and Meat Inspection, New York State Veterinary College at Cornell University, and Director of the College. Over 500 pages and 101 illustrations. 1912. Ithaca, N. Y., Carpenter and Company.

This work is the outgrowth of a lecture course by the author to his student body, which has accompanied the laboratory work in bacteriology and protozoology, and has been prepared as a textbook for veterinary students beginning the study of microbiology; whose purpose has been to point out the rôle of microorganisms in nature; to give the methods of their study and identification; to indicate the relation of certain species to animal diseases; to give a description of the more important species pathogenic for animals; and to discuss briefly the reaction of the tissues to microbial invasion and the theories of immunity. It is not exhaustive, but rather elementary in character. Being a teacher, the author has realized the fact that the undergraduate can only familiarize himself with a few of the essential facts and principles, and so has only given the essential principles and theories of infection; and in order that the volume may be of further aid as a key to the *entire* subject, numerous references to the literature are given, where the student can obtain at first hand the results of original research; and further, a list of text and reference books are appended. Chapter I is an Historical Sketch, which is extremely interesting and instructive; Chapter II deals with Bacteria and Their Place in Nature. Chapter III, Morphology of Bacteria. Chapter IV, Classification of Bacteria and the Identification of Species. Chapter V, Bacteriological Apparatus, and so on throughout the work, the subjects of Sterilization and Disinfection, the Preparation of Media for the Cultivation of Bacteria, the Isolation and Cultivation of Bacteria, the Examination of Cultures, the Microscopic Examination of Bacteria and Stains Employed, Vital Activities of Bacteria, the Use of Animals in Bacteriological Examinations and Investigations, the Bacteriology of Water and Milk, the Genus *Streptococcus* and its Species Pathogenic for Animals, Genus *Micrococcus* and

the Genus Bacterium in the same sense; a Few Species of the Genus Bacterium which Are Commonly Not Pathogenic, the Genus Bacillus and its Species Pathogenic for Animals, the Genus Pseudomonas, Migula, Higher Bacteria and Fungi Pathogenic for Animals, Protozoa, their Classification and Species Pathogenic for Animals, Epizootic Diseases of Undetermined Etiology (Filterable Viruses), Specific Bacterial Products, Tissue Reactions and Immunity, Serum Diagnosis and Immunity and Vaccine Therapy are all respectively dealt with in the remaining twenty chapters. The author's clear and concise manner of expression and the many illustrations make the study of microbiology fascinating and its principles easily mastered. Mallein, vaccine, tuberculin, etc., are all discussed, both as to their preparation and use, also the agglutination test. So that *Moore's Principles of Microbiology* is an indispensable volume to the veterinary students and to the older practitioner who would be in possession of the present-day knowledge of this important subject.

THE NEW YORK VETERINARY SCHOOLS OPEN.—The New York State Veterinary College at Ithaca, opened September 23, and the New York-American Veterinary College in New York City opened September 26 with excellent prospects for the 1912-13 term.

RENEWED ENERGY IN THE LIVE STOCK JOURNAL.—This enterprising stock paper, edited and published by Mr. T. Butterworth, Chicago, has always been a live one, and has always had up-to-date views on all matters pertaining to live stock, inspiring an increasing interest in draft horse breeding by constantly sustaining that branch of live stock industry. But in the last few months it has taken on a new dress, coming out in pale green covers, and has in other ways exhibited evidences of new life generally, which have not escaped the notice of the REVIEW any more than that of its many readers who look to it for advice in the many breeding problems which they encounter daily.

OBITUARY.

THOMAS EARLE BUDD, D.V.S.

Dr. T. Earle Budd died at the Orange Memorial Hospital, Orange, N. J., at 4 a. m. September 13, 1912, as a result of blood poisoning; he having become infected while performing an autopsy on a cow, supposedly suffering from anthrax. The doctor was taken to the hospital three days prior to his death, and appeared to be improving up to the morning of his death, when he changed for the worse, and the end came rapidly.

Doctor Budd was 52 years old, having been born in Pember-ton, N. J., in 1860. He was graduated from the University of Pennsylvania, and studied veterinary medicine at the American Veterinary College in New York City; from which institution he received his veterinary degree in 1892; when he at once began to practise his profession at Woodbury, N. J. After a short time, however, ill-health demanded a change of residence, and he moved to Orange, N. J., where he enjoyed a lucrative practice up to the time of his death. He was deeply interested in state affairs, especially when in connection with his profession. He has filled the following official positions: Member of the Army Legislative Committee, A. V. M. A., Member of Live Stock Commission of New Jersey, Treasurer of the New Jersey State Board of Veterinary Medical Examiners, Veterinarian to the Essex County Park Commission, Veterinarian to the Essex Troop, N. G. S. N. J., Inspector of Tuberculosis of the State of New Jersey. Has always been an active member of the Veterinary Medical Association of New Jersey, and has been president of that organization and has also occupied the executive office of the Alumni Association of the New York-American Veterinary College.

A few years ago Dr. Budd was sent by the State of New Jersey to Scotland to purchase Clydesdale stallions for the improvement of the draft and work-horses in that state. He occupied a high social position in his community and was highly respected and esteemed by his fellow townsmen for the upright and honorable life that he had lived amongst them; and his sudden and untimely demise has been a great shock to them. His domestic life was beautiful. He is survived by a widow and one daughter, Mrs. Victor Schwartz, to whom the hearts of the entire community turn in their sad bereavement.

ARMY VETERINARY DEPARTMENT.

STATUS AND PROSPECTS OF THE ARMY VETERINARY BILL.

"H. R. 16843, a Bill to consolidate the veterinary service, U. S. Army, and to increase its efficiency," has not passed Congress during the session just ended.

The Bill had been favorably reported by the Committee on Military Affairs of the House of Representatives on April 26, 1912. There were hopes entertained by the chairman of the legislative committee, A. V. M. A., and by many of his supporters, that the Bill might be passed by the House of Representatives, and that, perhaps also, it might be favorably reported before adjournment of Congress, by the Committee on Military Affairs of the Senate.

But the Army Service papers do not report any further progress of the Bill, so that the net result accomplished so far remains the favorable recommendation of the Bill by the Committee on Military Affairs of the House of Representatives.

Small as this result may appear to the pessimists, always with us, it is yet of the first magnitude. It constitutes the driving cone for the future onward march of the Bill. Several times the Senate did pass our former army veterinary bills, but they were always blocked in the Military Committee of the House. It was, therefore, a good strategical move of Chairman Hoskins to commence his labors with that latter committee, and the success he attained there gives him a sure foundation by having overcome the most difficult part of the work first. The House would have undoubtedly passed the Bill on the favorable recommendation of its Military Committee, but the turmoil of the closing days of Congress undoubtedly prevented it from being taken up on the floor of the House.

This is the present status of the Bill. It is not known what plans have been made by the chairman of the legislative committee, A. V. M. A., for the fight in behalf of the Bill, during the next session of Congress reconvening on December 4, 1912. He has the situation well in hand, to use a phrase. Not his

phrase, but one just given to the writer by mail by one of his staunchest supporters in the campaign just ended. This letter also brought the news that Dr. Hoskins had consented to remain on the legislative committee, A. V. M. A., which was doubtful. This is as it ought to be, because he is not only thoroughly acquainted with the situation in and around Congress, but he has also thoroughly canvassed both branches of Congress, and, above all, he has a bunch of promises of support in his hands that nobody else could make proper use of in guiding the Bill towards its passage.

What we need now to do is to strengthen the hands of Dr. Hoskins in making careful plans for the finishing campaign of the Bill during the next session of Congress. Such plans, to be transmitted into action, need the continued enthusiastic support of the entire American veterinary profession. The fight fought so far, has shown our colleagues all over the country united in effort, so full of unity, strength and will as was never witnessed before in any of our former legislative attempts. If this proof of good will and united effort is continued for just a fraction of another year, a great, general victory will be won during the next session of Congress. It is not only that the Army Veterinary Bill is at stake, but the reputation and standing of the whole of our profession, which does no more than ask for its legitimate right to practise our science in an intelligent manner in the United States Army. As we are right, we must win out some time, and the chances are good, in fact better than ever before, that we shall carry our point during the winter session of 1912-1913.

This is the way the situation looks to the writer. He is not unmindful of the tremendous amount of earnest work that lies before us in trying to accomplish this work, nor does he underestimate the tenacity that will be needed to overcome certain obstructions that lie now, as ever before, in the way of this little Army Veterinary Bill. Their nature is well known to those who are initiated into the mysteries of the game of politics, and who understand the sentiment and established power of opposing forces.

But with all these things, and the persons representing these things, facing us, we are justified in looking at the situation with hopeful optimism. With apologies for the pessimists: Here is to the victory of the Army Veterinary Bill during the next session of Congress. And I shall drink to this toast, at the proper time, in genuine beer in old Germany.

O. S.

ARMY VETERINARY NOTES.

Veterinarians Walter R. Grutzman, 15th Cavalry, and Olaf Schwartzkopf, 3d Cavalry, have each been granted leave for four months, with permission to go beyond the sea, to take effect in October. Their itinerary includes visits to the Army Veterinary Schools at Aldershot, England; Saumur, France, and Berlin, Germany, and to several of the renowned European veterinary colleges. Mrs. Schwartzkopf will accompany her husband.

Veterinarian Henry W. Peters, 14th Cavalry, was granted a leave of two months at his return from the Philippine service, and is now enjoying with Mrs. Peters a well earned vacation at his home state.

Recently it was decided by War Department order that veterinarians and chaplains of Cavalry and Field Artillery need not take the obstacle rides prescribed for officers of the mounted service. This is the second time that army veterinarians have been exempted from proficiency tests in riding, and it is greatly to be regretted that this was done on the request of some of our colleagues. We have to give instruction to officers in hippology, and are almost daily consulted on questions of conformation and capacity of horses as officers' mounts. An army veterinarian who can only teach the theories of hippology and who has never himself practised these theories by personal application, can only be a poor teacher and judge on these questions, and really ought not to be in the army service in mounted regiments. If we want to make for advance in the army veterinary service and become officers of an army veterinary corps, we must cease to consider ourselves qualified by just applying a little salve here, a liniment there and occasionally a hypodermic injection, as do mere medicine men. We must become military horsemen, which the field service demands of us by its very nature. The veterinary officers of all European armies are required to be expert riders, because their position requires the knowledge and practise of skilled and fearless riders. The time is at hand when we must be in the same class.

The case of the chaplains is entirely different. No knowledge of horses is required of them, and their dignity suffers nothing by making poor figures on horseback if they accompany mounted troops. It is a pity that by the leniency of the War Department we are put in the category of chaplains in this respect.

SOCIETY MEETINGS.

AMERICAN VETERINARY MEDICAL ASSOCIATION.

At the conclusion of a night letter sent from Indianapolis to fill a space left vacant in our editorial pages to receive a few advance words on the 1912 meeting from the convention city, we stated that a detailed account of the Indianapolis meeting would be published in our next issue. In addition to these few advance words editorially, we also gave our readers, in the September REVIEW, a little over five pages of notes on the meeting—the essence of what transpired in brief—including the resolutions presented and adopted. It now, therefore, but remains for us to round out our report in the present number, giving it the fullness that neither time would permit nor our remaining space accommodate in the September issue. President Brenton, after formally declaring the forty-ninth annual meeting in session, introduced the Hon. Charles Bookwalter, ex-Mayor of Indianapolis, who welcomed the association to his city in the following appropriate and pleasing words:

Mr. President, and Ladies and Gentlemen: I feel as though this will be a memorable day in my life. First, because I am permitted to stand in a position which should have been occupied by the distinguished ex-Vice-President of the United States, a resident of our good city, who unfortunately has been called out of town. I feel that first of all it is essential that I should apologize to you for the great descent which naturally comes from the ex-vice-president down to the ex-mayor. The chasm is so broad that it will not take the fervid imagination of a "horse-doctor" to conceive of my performing the function this morning. However, I can only do the best possible under the circumstances.

Secondly, it is a memorable day to me because I have been asked to address this morning this distinguished gathering of not less than five hundred representatives of your profession from all sections of the country, and because I have been initiated, at least in the first degree, into the presence of so many surgical instruments, which to me is an education in itself, and modesty compels me to confess that the only one, the use of which I thoroughly understand, was the one with which I was presented. It

is a very useful instrument, in the use of which all of us have been educated, and which many of you recognize has a very broad application. For the benefit of the members of the press who are present, I would say that I was informed that it was a bottle-opener. (Laughter.) I presume that is not the proper name for it. I presume its use is not confined to any one particular kind of bottles, but you know how it is, somehow or other the Hoosier mind always associates a thing of that sort with that particular brand. I have been educated in the use of this delicate little instrument, which is so convenient at times, and the absence of which is so embarrassing whenever an emergency presents itself.

As I look out at this audience before me, I am ready to realize what a far reaching step forward has been taken since the days of my boyhood; and when I compare the personnel of this with the old-fashioned "horse-doctor," who used to visit my father's farm. He generally took care of the horses on our place when he was not otherwise occupied in treating the "stalls," and he seemed to be generally recognized in the community as a sort of one-day stall himself. When I come here to-day, and find gathered in Indianapolis this great body of hundreds of men, who have dedicated their lives to this science, I am indeed forced to the conclusion that the world is progressing along other lines than those referred to by the political speakers of the present day. Indianapolis is so much accustomed to entertaining conventions that it requires one of unusual character to break a ripple on the surface, but I must admit to you that when there is gathered in our capital city this magnificent representation of this new profession, it is indeed an eye-opener to all of us.

When we were informed some few months ago that this national association was to hold its meeting here, the scope and magnitude of the gathering did not at any time impress itself upon our minds, but since we have seen the things which we have to-day, and heard the remarkable statements which have been made as to the progress of your great profession, we are forced to a realization of the importance of this great profession, and it becomes indeed a pleasure and delight to the people of the Hoosier capital, not only to welcome you here, but to know that you have selected our home town as the place for your gathering. A veterinary surgeon, in my mind, occupies a rather unique position before the American people. Some eight or nine years ago a mechanical genius of our land invented a horseless vehicle, and then arose up prophets upon all sides, none of whom have

proven themselves to have been a seventh son, or to have been born with a veil, gentlemen who said that the day of the horse had ceased, and that it would only be a limited number of years before vehicles propelled by horses would be such a scarcity as the automobile was when it started to run through the streets of this city, along in 1898 and 1899, but in spite of these direful prophecies, the use of the horse remains with us to-day, and I imagine will continue to remain with us as long as these great American people continue to be an agricultural people, because agriculture is the very basis of the prosperity of our land, and agriculture without the use of the horse could scarcely be carried on; consequently, the veterinary surgeon will remain with us as long as the draft horse is a necessity in our commercial life, and as long as the pet is to be found about the household. I well understand and know how serious a matter it has become where the household has become wedded to a particular pet, and I also well understand and appreciate how serious a matter it is in a case where the household has become wedded to a household pet, and we wake up some morning and find there is something the matter with that particular pet, which requires the attention of a veterinarian. If that pet is sick, it is almost a dead race to see how quickly we can get to the telephone to summon this professional man or that man to alleviate the sufferings of that pet, which means so much to the household. I am not comparing a household pet of that kind to the partner of my sorrows, but the household pet in the sense of importance, and it is only given as a relative illustration to demonstrate to you that so long as the American people continue to be a people who have some natural and wholesome impulses manifested in the love of dogs and ponies, and our other domestic animals which we have about the household, just so long will there be a demand for men of this profession.

Any following in life of importance, and any profession has a commercial side represented by the manufacturing side, and that in your case shows a great amount of inventive genius, skill and brains given to the careful manufacture of these beautiful instruments, such as I have seen down stairs this morning. These alone are evidences, not only that the profession has come to stay, but has come to be developed into a calling which knows the needs of the live stock interests of this country, and demands the respect of the people of this country.

I am glad indeed to know that you have come to Indianapolis. It is a beautiful city. I trust that you all may have an op-

portunity to visit its beauties while you are present with us here during the coming week, and I want you to feel that the hearts and homes of our people are open to you, and we extend to you in the broadest sense a true, genuine and hearty Hoosier welcome. I thank you.

After the hearty applause brought forth by Mr. Bookwalter's remarks had subsided, President Brenton requested Dr. John G. Rutherford to respond in behalf of the association, which he did in true Rutherfordian form, as follows:

Mr. President, Ladies and Gentlemen: It certainly gives me a great deal of pleasure to have an opportunity on this pleasant occasion to reply to so genial an address as that which we have just heard this morning from Mr. Bookwalter. I came all the way down here from Calgary, Alberta, at the base of the Rocky Mountains, on purpose to reply to the address of welcome, which was to have been delivered on this occasion by ex-Vice-President Fairbanks of the United States, and I had heard one or two expressions of regret during the last few hours on account of the fact that the distinguished ex-Vice-President of the United States was not able to be with us, but I am sure that if any member of this body had any regret at his absence, that regret has been completely obliterated by the exceeding geniality and cordiality of this address, to which we have all listened, from Mr. Bookwalter this morning. I feel sure that if the distinguished statesman had been here he could hardly have made a speech which makes us feel so thoroughly at home as the gentleman who took his place this morning. After all, that is the most important purpose and object of an address of welcome,—to make people feel at home in the city in which they happen to be for the time being, and I am sure we have no reason to regret, but rather every reason to congratulate ourselves upon our good fortune in the selection of the ex-Mayor to deliver the address of welcome to us this morning. We reciprocate very much indeed the friendly and cordial remarks of Mr. Bookwalter.

I could not help but think as he spoke of the partner of his sorrows that if we are to be looked upon as judges, and that if his speech to us this morning is any sample of his usual manner of address, that the other would be much more appropriate to the partner of his joys, but I am satisfied that Mr. Bookwalter has much more joy than sorrow in the relation to which he referred. If that were not the case, he certainly would not have been able to have delivered so genial and appropriate a talk as he has given to us this morning. He spoke of the progress of the

veterinary profession, and in a few brief words contrasted the difference between the old "horse doctor" and the modern veterinarian. In fact he appealed to my personal memories in this great state of Indiana, because some thirty-two years ago I wandered down here from the wilds of Canada into the state of Indiana and commenced the practice of my profession in what is now one of the most prominent cities of the Hoosier State. I can fully substantiate Mr. Bookwalter's memories because I think the facts to which he refers were going on quite extensively at about the same time as my own experience in this state. When I came to Indiana, although, of course, I owned and used the title of "Veterinary Surgeon," I found that nobody knew what it meant. (Laughter.) There was in the town in which I was located at that time, a gentleman who had a sign on his place of business. He was one of the old-fashioned type of "horse doctors" to which the Mayor referred. I need not tell you that I had rather a hard time. I was a bit of a curiosity in that Indiana town because I had a hat the style of which was not generally known in the town which I was located in, and which caused me to be looked upon with considerable curiosity in that particular part of the state. I think I had the only one of that style in the State of Indiana at that time. That was not the only peculiarity which I had. I had several other peculiarities. I remember that was only one. I used to use a tight cord to hold my unmentionables together, and I was a bit of a curiosity on that account. When I used to walk about the street, the girls of the town used to stand and look at me. I am afraid I was considerable in advance of my time in that place. (Laughter.)

One day there was an old chap, who was rather a dignified man, and who always wore a top hat and Prince Albert coat. He had once been in the East, and I suspect got his notions of dress from that quarter. He was in my office one day, and he says to me, "Doc, where did you come from, anyway?" "Well," I says, "I came from Canada." "Well," he says, "that is not much of a place, anyhow." (Laughter.) He says, "I was down in Niagara Falls once on an excursion, and I saw a place across the bridge, and I said to somebody, 'What place is that?' They said it was Canada. So I went over and walked all over the dog-goned place, but there was not much to it, and it did not amount to anything, anyway." (Laughter.)

I came from Canada, and, as you can see, the old fellow's opinion of the place from which I immigrated was not very favorable. Between his opinion and the opinion of the towns-

people, whom I have strongly suspected of looking upon me as something of a freak, I can quite strongly substantiate what Mr. Bookwalter has said this morning about the profession in his early days, and I rather think from his description of the gentleman who came to his father's farm, he was rather superior to the general run of veterinarians in that day. We have progressed. We have gone along until we are at the present time a very substantial, a very reputable and respectable profession. We are improving. Another thing, we are able to corroborate the statement which the Mayor made this morning as to the fact that we are not going out of existence for quite a while yet, and that most of us that are in the profession to-day will probably die in it, unless we make a mistake and get into politics, either municipal or federal, in which case the end can readily be foreseen. (Laughter.)

There is, of course, a phase of the veterinary business which Mr. Bookwalter did not touch upon, and to which he did not allude, namely, that of veterinary sanitation. That particular phase of our work, as you all know, is coming to play a very great part in the practice of veterinary medicine. We all appreciate very much indeed the kindly remarks of Mr. Bookwalter with reference to the household pet. We hope that the domestic pet will be a long time in dying out of the hearts of the American people. We fully realize the serious responsibility of being wedded to one woman, and, as the Mayor has very artfully intimated, it is serious (Laughter) because, as we know, no one man can very well serve two masters. I know a fellow that tried it once, and he is now serving a term for bigamy (Laughter), and I feel, as I said before, that in the matter of Mr. Bookwalter, while he made the serious step of being wedded to the woman who was invited to wed him, I am sure that he certainly felt that she was not suffering any grievance on account of being wedded to only one man. (Laughter.)

I was greatly impressed with Mr. Bookwalter's reference to the little souvenir which he received down stairs this morning, and I felt when he told of the various uses to which that little implement could be put, that perhaps I ought to give him a word of warning, and as I was not quite sure that I would have the opportunity of giving it to him privately, I may be justified to take this big audience into my confidence, and give it to him in this public manner. I want him to avoid, if possible, the unfortunate mistake which a fellow made who was on a trip away from home. When he came home, his wife said to him, "John, did

you enjoy your trip?" "Oh," he says, "it was rather of a long trip all together, but that would not have been so bad, if I had not lost my luggage." "Lost your luggage? But how did that happen?" she said. "Oh, the cork got loose, that's all." (Laughter.)

Now then, ladies and gentlemen, we certainly appreciate to the very full the very kindly and hearty welcome which we have had this morning. I have had in common with a good many of you the opportunity of listening to a good many addresses of welcome in various parts of this continent. We have had them of all kinds. They have all been nice and friendly, and they have all been appreciated by the members of the American Veterinary Medical Association, but I have no hesitation in saying that the address that Mr. Bookwalter has given to us this morning will stand out even among the considerable number of eloquent, friendly and kindly addresses to which we have listened in different places in which our conventions have been held,—it will stand out by itself, as one of the best, if not the very best, to which we have ever listened. (Applause.)

On behalf of this association, Mr. Bookwalter, I desire to convey to you, and through you to your fellow citizens of the City of Indianapolis, our sincere appreciation of the cordial and fraternal welcome which you have accorded to us, and to express the hope that the cordial relations between this association and the people of Indianapolis, so happily begun, will always remain as friendly as they are at the present moment."

To say Dr. Rutherford's remarks delighted his audience, would be putting it mildly; as was attested by the rousing applause that followed; after which the president delivered one of the most wholesome and helpful addresses that the members have listened to in some time, and it is to be hoped that the younger members to whom he delivered some sound advice, will realize the importance of his remarks. The older members showed that they fully shared his views by their conduct at the several executive sessions.

PRESIDENT BRENTON'S ADDRESS.

Fellow Members of the American Veterinary Medical Association, Visitors, and the Ladies: In again acknowledging my appreciation of the great honor done me a year ago at Toronto in electing me to the highest office in the gift of the profession in America, I do so with a full sense of the responsibility which goes with that honor. I wish to emphasize what was said a year ago that the appreciation is all the greater on account of the

honor coming upon the anniversary of my majority, on the threshold of my Alma Mater, in the land of my birth, and largely by the assistance of my associate residents in the land of my adoption.

Ever since the Toronto meeting I have been trying to figure out why such an honor should be bestowed upon a humble member in the ranks, as it were, and long ago I came to the conclusion that it was not from any personal worth or any accomplishment of my own, but as a compliment to the Michigan State Association, as well as a tribute to the practising veterinarians, from whose ranks a presiding officer had not been chosen for a number of years.

I have thought, too, that it might be for the purpose of getting rid of me by putting me on the shelf, as so many of the ex-presidents have dropped out of service as soon as their term of office had expired. But I want to give you a fair warning right now that something else will have to be done to prevent me from meeting my associates at each anniversary, and returning the hearty hand-clasp, and hearing the kindly expressions which make life so much worth the living. At each anniversary some familiar face will be missed, for the Grim Reaper will exact his toll, and although the ranks will be filled by others, there are those who have so endeared themselves to us that their memories should ever be kept green by some permanent memorial. The Committee on Necrology will take proper notice of those who have departed this life during the past year.

This association is nearing its fiftieth milestone, and how best to commemorate that event has been the study of several of the members from the East, and it seems but proper the anniversary should be celebrated at the birthplace of the U. S. V. M. A., now the A. V. M. A. The question now is, how can we make the meeting most memorable? One way is by increasing the membership, which should be doubled in the next year, and that could easily be done if each one would constitute himself a committee of one and send in to the secretary at least one new name, and as many more as possible of his worthy associates. In that way we would be able to celebrate our golden anniversary with a membership of not less than 2,500. Let us all do our part, and even the officers, each, will have to get a hustle on to entertain the hordes which will be with them in 1913. The 1913 committee in their report will tell you how to do the rest.

The forty-ninth anniversary of this association has opened so auspiciously that I am led to believe that a wise selection as to

the location was made by the Executive Committee in choosing Indianapolis for 1912, it being near the center of population and easy of access from every quarter. With what is perhaps the greatest number ever assembled on the opening day, and with a real Hoosier welcome which had been promised us by the local committee a month ago, and emphasized by the kindly and earnest words of the speaker this morning, I am sure we can already anticipate a very pleasant time and a profitable meeting. We have had a gradual increase in the number of applications during the past few years. In looking over the report of the meeting of the U. S. V. M. A. for 1891, the secretary's salary, which was one hundred dollars per year, was increased to two hundred dollars. The income at that time was from seven hundred and fifty to eight hundred dollars, there being less than three hundred members. Dr. Hoskins, who was secretary at that time, spent considerable more than his salary attending different meetings in the interests of the parent association. He also sent out over five thousand communications of different kinds and nine hundred and fifty notices of the meeting. Then we were satisfied if the secretary's expenses did not exceed four or five hundred dollars so that there would be a balance of two or three hundred dollars in the treasury. At the present time we have a membership of approximately fourteen hundred, and the work of our secretary had been advancing during the past year and as proof of it just scan the program which has been prepared with its feast of good things for your entertainment and instruction, and a consequent increase in the duties of the secretary, and I would recommend in view of the greater importance of the coming meeting that the secretary's salary be increased to a sufficient amount to allow him to employ a permanent stenographer or assistant in the work of the office so that the same can be attended to promptly. We have an income of about \$6,000 with fees and dues.

The President, Dr. Huidkoper, at the time I have referred to, recommended that applicants for membership should be fixed members of their County or State Association, which is now being done, and I believe it is a wise move.

I wish now to publicly thank all the officers of this association for the many courtesies extended, and to express my appreciation of the work done by the members of the various committees with whom my associations have been so pleasant during the past year. The Legislative Committee came under the direction of the able and energetic chairman, Dr. Hoskins, and has waged such a campaign at Washington in the interests of army legisla-

tion that they are still in hope that the bill giving rank and recognition to the Army Veterinarian may become a law in the near future.

That Dr. Hoskins has found out to his satisfaction where the opposition to our bill has been coming from for the past twenty years or more, and he has succeeded in smoking out the Military Department. If ever a committee's work deserved success, the Legislative Committee does this year, and recognition in some substantial manner should be given Dr. Hoskins for his unselfish work on that committee and for the time and money expended.

The Publication Committee deserve great credit for their work in getting out their reports in record breaking time.

The special committee on college investigation have accomplished a great deal with the small amount of money appropriated, and I am very glad to state that they are ready to report a steady improvement along this line.

I do not know whether the Committee on Veterinary Anatomical Nomenclature are ready to report, as the Chairman, Dr. Sisson, is in Europe, but I believe that an appropriation will be necessary to aid them in their work for the coming year.

That serum therapy does now and will in the future play a very important part in the prevention and eradication of disease I am satisfied, and that its use with the aid of sanitary science will within a few years' time be the means of controlling many of the infectious diseases, but greater care should be exercised in the manufacture and distribution of the same.

Among some of the later serum or vaccine used, I might mention that for the treatment of distemper in dogs, which is a boon to both the owner of our most faithful friend and the veterinarian who may have the treatment in hand. You will probably hear more later regarding the treatment of same from Dr. Ferry, who succeeded in isolating the germ of that fatal malady, canine distemper.

The Phylacogen, or modified vaccine, which is being used very extensively by the medical profession in the treatment of various diseases with very satisfactory results, is being introduced into veterinary practice, and I must say that the reports from some of our associates in the treatment of pneumonia and influenza and even in infected wounds have been quite remarkable.

I am very glad to note that through the work of one of our older members that the profession in England as well as Continental Europe are awaking to the fact that something may be learned even from the Americans. I am speaking now of Brother

Williams' operation for roaring, which he introduced into England and which is being practised so largely by Prof. Hobday, whom many of you met in Toronto last year, and has been taken up by the profession in Italy as well as the other countries of the old world; and I noticed lately in some report that the Russian government had sent some valuable stallions to Prof. Hobday to be operated upon.

That the profession in England have a more friendly feeling toward the profession in this country is evidenced by the reports received from over the water, and in this connection I might mention that in a letter received only yesterday from Prof. Hobday he expresses the hope that we may have a very successful meeting, and he would like very much to be with us, and he wishes me at the same time to call your attention to the International Veterinary Congress in 1914 to be held in London, and hopes that a large delegation from this association may attend that great meeting. I sincerely hope that a good number of us may be privileged to go to London at that time.

The meetings of the A. V. M. A. in the various states where they have been held, as a rule, have been productive of much good, and I have every reason to believe that the Indiana Veterinary Medical Association will have no cause to regret the great effort they have made in order to properly entertain this immense gathering, and I sincerely hope that the profession in Indiana will feel that having this meeting of the A. V. M. A. within their border has benefited the profession in their state.

I know that the profession in Michigan was greatly strengthened by your meeting in 1900, and we will be glad to try and entertain you when you feel that you can again meet in the City of the Straits.

Our association had a period when an unseemly struggle for official places, both elective and appointive, characterized our annual meeting. The getting of office for themselves or friends engaged time and thoughts of members to such an extent that the usefulness of this association as a scientific organization became of secondary consideration to many. So obnoxious had the political methods employed become, and so great was the perversion of the time of the meeting in the scramble for office, that our association ceased to attract new members or to hold the respect and co-operation of those who had joined for purely professional purposes.

So serious was the disruption of the legitimate work of the association through political methods of selecting officers that

this association framed into its organic law a provision making its ex-presidents, who are no longer eligible for elective office, a permanent committee on nomination, and by resolution expressly forbid nominating speeches.

Many of the newer members have no personal knowledge of the struggles to secure important places by ambitious individuals—to the very great scandal of this scientific body, and do not realize the beneficent influence of the present plan of nomination. It is very apparent to those who have long acquaintance with association affairs that our nominating committee has without prejudice endeavored to serve the very best interests of the association in its selections, and I commend a very careful study of the excellence of this plan of selecting nominees for office to those who have become members in recent years, before they shall enter into what seems to be a growing discontent with the present method because of the agitation of a few who are ambitious and seek to control through political methods, regardless of the baleful influence of such methods. I sincerely hope that the younger membership will take counsel of their elders in this organization, that we may go on with the better and more amicable methods of selecting officers.

Before closing, I wish to pay a compliment to the ladies, who have done so much, not only to increase membership in the association, but who have made our meetings better in many ways. I am glad to see so many of them present with us to-day. (Applause.)

The conclusion of President Brenton's address brought to a close the morning session, the first session of the forty-ninth annual meeting. The ladies having been present at this session, lunched with the gentlemen in the café of the German House, after which they took themselves off pleasure seeking, while the men sought out for themselves the particular one of the three sections in session, that appealed to their needs or desires; as at that time First Vice-President Moore was presiding over the section on Practice of Veterinary Medicine in Room A, under the directorship of Dr. H. D. Gill, Second Vice-President Van Es was presiding over the section on Surgery, in Room B, under the directorship of Dr. W. L. Williams, and Third Vice-President Jensen was presiding over the section on Sanitary Science and Police, in Room C, under the directorship of Dr. Charles H. Higgins. The section on practice had five excellent papers that were comfortably read and properly discussed; the section on surgery had three papers, and the section on sanitary science

had six papers, making a total of fourteen papers that were read and intelligently discussed during a half day session; a condition only made possible by the section system, and proved the efficiency of that system where the program is carefully arranged, and the sections properly handled. Tuesday evening offered two attractions, a reception at the Claypool Hotel and a general session in the auditorium of the German House, where the president listened to the reports of the executive committee, to the several officers' reports (secretary, treasurer and librarian), to the report of the committee on diseases, and of the delegates from the state and other local associations. A surgical clinic was on each morning, beginning Wednesday, from 9 to 12, while papers were being presented to each of the sections each morning from 10 to 12, so that those who did not want to give all their morning to the clinic could attend the clinic for an hour and then attend the section they chose for the next two hours. Each afternoon, beginning Wednesday, was given to a general session, which all attended together in the auditorium. There was also a general session on Wednesday evening which all attended, at which time election of officers took place. This session lasted until eleven o'clock in the evening, and was followed by a Dutch lunch and vaudeville in the Palm Garden of the German House. Thursday evening was devoted to the annual banquet. Friday with an all-day clinic, section work in the forenoon, and a general session in the afternoon, which was concluded by the installation of the officers for the coming year, brought to a close the most successful meeting in the history of the American Veterinary Medical Association.

THE CLINIC.

After the afternoon session on surgery in room B on Tuesday, 27th, the further work of that section was conducted at the Indiana Veterinary College in the form of a surgical clinic, which began at 9 a. m. on Wednesday, 28th, presided over by Fifth Vice-President Roberts, and under the directorship of Dr. J. W. Klotz. The amphitheatre furnished ample seating room, and with a large and small operating room, each provided with an operating table and plenty of floor room where horses could be operated upon thrown, a tremendous amount of clinical material was used to advantage. Another very helpful feature of the clinic was the lectures that were given by the operators, before, during and after an operation. Before the operation the

indications for its performance, the dangers and complications to be encountered and avoided, and the probable results to be expected; during the operation the operators stopped at the various steps in the operation, explaining what had been done up to that time and what the next step would be, etc.; after the operation an explanation as to what had been finally accomplished during the several steps, all of which was extremely interesting and instructive.

Case I.—Bay gelding; malignant tumor; operator, Dr. W. L. Williams, Ithaca, N. Y. Dr. Williams explained that the subject was about 10 years old, and that for about 12 weeks it had been noted that he had had some difficulty in respiration, enough, in fact, to make an operation necessary. Besides, he could swallow neither food nor water with any degree of comfort. Examination revealed a new growth in the throat about the size of a finger, situated between the epiglottis and the tongue. The animal was destroyed, a longitudinal section of the head made, exposing the tumor and confirming the diagnosis. Dr. Williams pronounced the tumor malignant, probably carcinomatous.

Case II.—Bay mare; fistulous tract in withers; operator, Dr. W. A. Axby, Harrison, Ohio. Dr. Axby explained upon examining the case that it was a chronic condition, which had never been operated upon, but that caustic had been applied at various times. Upon further examination it was shown that the tract extended down an inch and a half behind the scapula. After laying the tracts open they were packed with gauze, with the recommendation that the parts be kept clean with an ordinary salt solution, and that bacterins be given in increasing doses every four or five days.

Case III.—Light sorrel gelding; roarer; operator, Dr. J. H. Blattenberg, Lima, Ohio. The animal was cast and put under general anaesthesia; the throat shaved and washed, and tincture of iodine applied. Dr. Blattenberg then proceeded to perform the Williams' operation, using the Blattenberg burr. Dr. Blattenberg said he was frequently asked about stitching after the mucosa had been taken out, and said, "I do not stitch."

Case IV.—Four-months-old colt; operation for knuckling; operator, Dr. John W. Adams, Philadelphia, Pa. After an extremely interesting discourse on the condition and the indications for the operation, its probable results, choice of instruments employed, etc., the colt was secured in hobbles and laid on its side, and tenotomy performed, with result that the little animal put the foot flat on the ground on being released.

Case V.—Bay mare; roarer; operator, Dr. W. L. Williams. After an interesting talk on the operation, Dr. Williams operated on the left side, as the right side appeared to be all right, he explained. The mucosa was removed with the burr.

Case VI.—Bay stallion; scrotal hernia; operator, Dr. J. H. Blattenberg. Case explained and a talk on the condition and the operative procedures contemplated, by Dr. W. A. Axby. The horse, which had been under a general anaesthetic, revived within three minutes after ammonia had been placed to the nostrils, and walked to his stall.

Case VII.—Bay gelding; quittor; operator, Dr. W. L. Williams. Who, after explaining that he had been asked only that morning to operate, and the foot was not as clean as he would like to have it, so he would have to operate under antiseptic instead of aseptic conditions, proceeded to perform the Baer operation. In removing the horn over the lateral cartilages. it was found that the laminae were badly diseased, and over a large area were absolutely destroyed, the coronary band was so badly diseased it had to be cut away in order to get the part clean, and the lateral cartilages had nearly all disappeared, due to necrosis. At the completion of the operation, Dr. Williams stated that the case gave promise of a fair recovery, but that the coronary band would be considerably blemished.

Case VIII.—Sorrel gelding; necrosis of ligamentum nuchæ; operator, Dr. W. A. Axby. The necrotic tissue was removed and the wound packed and sutured and the animal released apparently suffering no discomfort.

Case IX.—Bay stallion; cryptorchid; operator, Dr. J. H. Blattenberg. The animal for this operation was placed in the centre of the floor of the amphitheatre, where the operation was performed by Dr. Blattenberg in a manner that proclaimed him a past-master at the work.

Case X.—Black mare; shortened tendon; operator, Dr. L. A. Merillat, Chicago. Ill. Dr. Merillat explained that this condition was due to inflammation of the carpal joint. The pain of synovial inflammation, or of ligamentous inflammation, had caused the joint to be held in a state of flexion, and to accommodate the new position, the tendinous structure is shortened. "The operation we are going to perform to correct this condition is known as carpal tenotomy," he said. After the operation, Dr. Merillat called attention to the fact that the leg had taken a pretty normal position. "It is a better leg than the opposite one," he said, "but you will notice half an hour from now, in the stall,

that the animal will find the same old position, and the application of a brace will be necessary to effect a cure."

Case XI.—Bay gelding; roarer; operator, Dr. L. A. Merillat. "Here is a horse that will probably not be cured by the operation," Dr. Merillat said, explaining that roaring in this case was due more to damage to the trachea, than to the larynx. "This is more of a clinical case than a practical case. Having the horse under anaesthesia, we can observe this condition." The Williams' operation was performed.

Case XII.—Bay gelding; operation for kick wound on inner aspect of tibia; operator, Dr. W. L. Williams. The operator stated that he understood that the animal had been kicked, and that it had been followed by necrosis with a sequestration of bone imbedded in the tibia. Proceeding with the operation, Dr. Williams found a fistula running behind the tibia, there was some necrotic tissue. After the operation, the wound was packed with iodoform. Dr. Williams stated that he had gotten to the bottom of the fistula, and consequently the case should do well.

Case XIII.—Bay gelding; nail puncture that had infected the foot; operation, resection of flexor-pedis tendon; operators, Drs. W. A. Axby and J. H. Blattenberg. Dr. Axby gave a grave diagnosis, explaining that the operation should be performed earlier, before septic changes have become so far advanced. The doctor had very little hope during the operation from the advanced necrotic condition, but upon completing it, stated there might be a chance. It was an excellent case for demonstration of tissue destruction from a nail puncture.

Case XIV.—Bay mare; ovariectomy; operator, Dr. H. Fulstow, Norwalk, Ohio. The doctor performed vaginal ovariectomy on a five-year-old mare, with colt, the mare being a nymphomaniac. She was high spirited and difficult to control, but the operation was finally performed satisfactorily.

Case XV.—Bay mare; ovariectomy; operator, Dr. H. Fulstow. The doctor found some difficulty to get one of the ovaries, as the mare was high-strung and the ovary was enveloped in the peritoneum. Dr. Fulstow explained that the ovaries were very cystic. This mare was also a nymphomaniac.

Case XVI.—Bay gelding; hydrocele; operator, Dr. George R. White, Nashville, Tenn. Dr. White said, "This horse was sent here for operation for scrotal hernia, but it is nothing more than an ordinary water sac, or water bag. It is one of the frequent sequelae to castration of the horse, but it is a *very* frequent sequel to castration in the mule. The presence of a water sac after cas-

tration, however, reflects as much on the veterinarian's ability as any one operation he can do." The operation completed, the horse (which had been cast with the old Conkey casting harness, 27 years old) was released and immediately got up and walked to his stall.

Case XVII.—Light sorrel gelding; quittor; operator, Dr. R. C. Moore, Kansas City, Mo., assisted by Dr. Geo. H. Roberts, Indianapolis, Ind. This was an exaggerated case of quittor; the operation was performed on an operating table in one of the smaller operating rooms of the college; the animal having been given two drachms of cannabis Indica in the jugular vein a short time before the operation. The operation was successfully performed and the horse seemed more comfortable after it.

Case XVIII.—Bay gelding; roarer; operator, Dr. J. N. Frost. Animal was cast upon the floor of the amphitheatre, and the Williams' method followed.

Case XIX.—Bay mule; arthritis; operator, Dr. W. J. McKinney, Brooklyn, N. Y. This operation for arthritis in the shoulder joint was done by puncturing to the condyle of the humerus. Drainage was established and the arthritis reduced successfully.

Case XX.—Bay mule; fibroid tumor; operator, Dr. Geo. R. White. This tumor was situated above the sternum in an aged mule. Two drachms of cannabis Indica was injected into the jugular vein, and the animal placed on an operating table. Two lateral incisions were made close to the base of the tumor, the adhesions divided, and the tumor, which weighed between 15 and 20 pounds, successfully removed, but the animal died before he could be placed on his feet, which was the only death that occurred during the entire clinic, which extended over several days.

Case XXI.—Heifer; ovariectomy; operator, Dr. John W. Jameson, Paris, Ky. The heifer was in calf; the operation was successfully performed.

Case XXII.—Heifer; ovariectomy; operator, Dr. H. M. Manly, Dayton, Ohio. This operation differed in interest from the last one only in the demonstration of the x-stitch by Dr. J. W. Klotz.

Case XXIII.—Bay gelding; handling of float; operator, Dr. C. C. Brown, Memphis, Tenn. Dr. Brown gave a demonstration on handling a float in the mouth of a horse, also in making an examination of a horse's mouth. The doctor came upon a split molar on the right side, sticking out into the mouth, which

he proceeded to remove successfully with a pair of forceps—not using any speculum.

Case XXIV.—Dapple-gray gelding; roarer; operator, Dr. John W. Adams. A tracheotomy tube had been inserted in this horse's trachea about two weeks previously. Horse was cast and chloroform administered, and the roaring operation performed.

Case XXV.—Bay gelding; median neurotomy; operator, Dr. John W. Klotz, Noblesville, Ind. This operation for lameness in the knee joint was quickly and successfully performed.

Case XXVI.—Bay gelding; fistula of poll; operator, Dr. J. H. Blattenberg. This operation was performed with the horse standing on the floor of the amphitheatre, an incision being made, and drainage provided for. After the pus had been drained out, peroxide was applied and the wound packed with sterilized gauze and sutured.

Case XXVII.—Bay mule; hernia; operator, Dr. J. H. Blattenberg. Animal was cast on the floor of the amphitheatre; there were no adhesions, so that the operation was a simple one, and was quickly and successfully performed.

There were also a number of minor operations and procedures on horses' mouths and on small animals, without lectures, making 56 operations in all. And, besides, there were a number of cases that were not reached, which Dr. Klotz operated upon the following Monday. Altogether, it was the most instructive clinic that has ever been held in connection with the A. V. M. A., and we believe in connection with *any* association.

The great success of the Indianapolis meeting was due as much to the organized system of conducting its affairs as to any other one factor, and the officers of the association and members of the local committee cannot receive too much praise for the formation of so excellent a program as was presented, and the orderly and systematic manner in which it was carried out. The disappointment of not being able to discuss the papers, which was experienced with the large program presented last year, was, so far as we know, entirely eliminated this year. The evening sessions on two evenings materially assisting in getting off much of the routine business.

The ladies were well entertained and share with the men the opinion that a Hoosier welcome is one of the most whole-souled and heartiest they have experienced, and one that will linger pleasantly in their memories for a long time to come.

 COMMITTEES APPOINTED BY PRESIDENT MOHLER FOR 1912-13.

GENERAL COMMITTEES.

Executive—A. D. Melvin, Chairman; Sesco Stewart, Joseph Hughes, F. Torrance, H. D. Gill, D. F. Fox.

Intelligence and Education—E. A. A. Grange, Chairman; Pierre Fish, C. H. Stange, W. B. Craig, R. A. Archibald.

Diseases—V. A. Moore, Chairman; L. Van Es, A. T. Kinsley, K. F. Meyer, C. M. Haring.

Legislation—W. Horace Hoskins, Chairman; W. G. Holingworth, J. P. Turner, James Robertson, F. A. Bolser.

Finance—Thomas A. Sigler, Chairman; H. Preston Hoskins, A. S. Cooley.

Publication—R. P. Lyman, Chairman; R. W. Ellis, George H. Hart, J. H. Blattenburg, Ward Giltner.

Necrology—O. L. Boor, Chairman; S. Brenton, J. G. Wills, A. H. Baker, A. Bostrom.

Resolutions—W. H. Dalrymple, Chairman; E. H. Shepard, George A. Johnson, S. H. Ward, George B. McKillip.

SPECIAL COMMITTEES.

Revision of Veterinary Anatomical Nomenclature—S. Sisson, Chairman; I. E. Newsom, S. L. Stewart.

Veterinary College Investigation—Tait Butler, Chairman; M. H. Reynolds, George W. Dunphy.

Agricultural College Education—A. M. Farrington, Chairman; Paul Fischer, James B. Paige.

Advertisements of Veterinary Remedies—N. S. Mayo, Chairman; C. A. Cary, S. B. Nelson.

Directors of Section Meetings—George H. Glover, Section on Medicine; L. A. Merillat, Section on Surgery; Chas. H. Higgins, Section on Sanitary Science and Police.

 MISSISSIPPI STATE VETERINARY MEDICAL ASSOCIATION.

This association convened at the A. and M. College, Agricultural College, Miss., September 6, 1912, this being the sixth annual meeting of the association. Though the session covered but one day, it was of unusual interest because of the interesting demonstration and the tubercular specimens and hog cholera serum prepared at the college. The morning was devoted to a

paper from Dr. J. A. Beavers on hog cholera and the results of serum treatment.

Dr. E. M. Ranck, State Veterinarian, gave a public demonstration of the simultaneous method of immunization of hogs against cholera. Drs. Oliver, Beavers and Ewing reported their good results with the use of this method.

The afternoon part of the session was called at 1.30 o'clock, after which followed the reading and discussion of a paper by Dr. B. M. Leigh on milk and dairy inspection. It was discussed by Drs. Oliver, Ranck, Ewing, Beavers, Edwards and Ferguson.

Dr. E. I. Keller then read a very instructive paper on gastric flatulence. This was discussed by Drs. Norton, Beavers, Oliver, Ranck and Roberts.

Many addresses were made complimentary to the President of the College, G. R. Hightower, and the Live Stock Board of this State upon the biological work along veterinary lines made possible by urgent and persistent efforts of the Board of Live Stock Commissioners and the State Veterinarian, Dr. E. M. Ranck.

Three new members were elected and received into the association: Dr. E. I. Keller, Okolona; Dr. J. A. Barger, Greenville; Dr. G. F. Smith, Macon.

Officers elected for the coming year: President, Dr. O. M. Norton, Greenville, Miss.; Vice-President, Dr. B. M. Leigh, Meridian, Miss.; Secretary and Treasurer, Dr. W. P. Ferguson, Grenada, Miss.

The next meeting will be held at the Agricultural and Mechanical College, Agricultural College, Miss., in September, 1913.

W. P. FERGUSON, Secretary.

DR. J. C. McNEIL DISLOCATES SHOULDER.—We read in the *Pittsburgh Chronicle Telegraph*, of September 23 that Veterinarian J. C. McNeil, superintendent of the food inspection bureau of that city, slipped and fell down several steps, dislocating his left shoulder. We extend our sincere sympathy to the doctor, and hope to report him recovered in our next issue.

DR. J. J. CRANWELL, Clarksburg, W. Va., writes in renewing his subscription: "I could not think of getting along without the REVIEW! Yours for a successful year."

NEWS AND ITEMS.

FORAGE POISONING OR SO-CALLED CEREBRO-SPINAL MENINGITIS OF HORSES.*

THE CAUSE OF THE DISEASE.—During the last five months numerous reports have been received by the Bureau of Animal Industry relative to the existence of forage poisoning in various sections of the United States, particularly in Louisiana, West Virginia, Kansas, and Nebraska. It has usually occurred when a hot, dry period has been followed by rains, or during wet seasons, especially those which are characterized by frequent rains alternating with hot sunshine, producing a damp sultry atmosphere. Such conditions are most favorable to the production of molds, and all outbreaks that have been investigated by the Bureau have been traced to the ingestion of unsound or moldy forage or feed, or to the drinking of water from wells or pools containing surface water drained through decomposed and moldy vegetation. The disease has been shown to be due to eating damaged ensilage, hay, corn, brewers' grains, oats, etc. Horses and mules at pasture may contract the disease when the growth of grass is so profuse that it mats together and the lower part dies and ferments or becomes moldy. No specific organism or virus has yet been found which can be considered as the cause of this disease.

HOW THE DISEASE MAY BE RECOGNIZED.—The so-called cerebro-spinal meningitis of horses being an entirely different disease from that which occurs in man, the symptoms as well as the cause are distinctly different. In the most rapidly fatal attacks death takes place in from 5 to 48 hours. Such cases begin with violent trembling or stupor and extreme weakness, or with staggering gait, partial or total inability to swallow, impairment of eyesight, followed by partial or complete paralysis, inability to stand, with marked delirium, during which the animal lying flat on its side becomes violent and knocks and bruises its head. In the second form of the disease the same line of symptoms may be noticed in a milder degree. Difficulty in swallowing, slowness in chewing the food and inability to switch the tail are observed. Breathing becomes heavy and noisy, and delirium may develop with stiffness of the spinal muscles or partial cramp of the neck and jaws. Death occurs in from 6 to 10 days. In the

* Circular letter issued by the United States Department of Agriculture, Bureau of Animal Industry, Washington, D. C.

last or mildest form the lack of voluntary control of the limbs becomes but slightly marked, the power of swallowing never entirely lost, and the animal has no fever, pain, or unconscious movements. In those cases which get well the animal generally begins to improve about the fourth day and goes on to recovery. One attack does not protect against a second attack, as horses and mules have been known to have the disease two or three times.

HOW THE DISEASE MAY BE PREVENTED AND TREATED.—The first principle in the treatment of this disease consists in a total change of feed and forage. Horses kept in the stable should be fed with sound forage and grain from an uncontaminated source, even if such feed has to be brought from a distance. Horses that have become affected while at pasture should be removed from the field in which they have been running. The animals should be brought to the barn or corral and fed on wholesome and clean feed and forage. The water, unless from an unpolluted source, should likewise be changed.

At present this preventive treatment is the only satisfactory method known for checking the disease, as all medicinal remedies used have been unsatisfactory in the vast majority of cases. The first indication is to empty the bowels and remove the poisonous products, but on account of the difficulty in swallowing, an aloes ball or Glauber's salt is hard to give. In fact no remedy should be given by the mouth if the throat is paralyzed, as pneumonia is liable to result. Fifteen grains of barium chlorid injected into the jugular vein, or 2 grains of eserine under the skin, if the animal is not too greatly depressed, will usually act promptly. Intestinal disinfectants such as calomel, salicylic acid, and creolin are also used. If much weakness is shown and the temperature is below normal give aromatic spirits of ammonia, digitalis, alcohol, ether, or camphor. Rectal injections of warm water are good, and warm blankets wrung out of hot water may also be applied to the body. Subsequent treatment should consist of 2-grain doses of strychnin twice daily, or a mixture of 2 drams tincture nux vomica and one-half ounce of Fowler's solution given at one dose, and repeated three times daily, to combat the effect of the poison upon the nervous system.

REPORT ON HORSE PLAGUE IN NEBRASKA, FROM DR. A. BOSTROM, STATE VETERINARIAN.

From Secretary Ferguson, of the United States Live Stock Sanitary Association, we received the following; including State

Veterinarian Bostrom's report to him, which Prof. Ferguson has issued in the form of a bulletin, to the members of the U. S. L. S. S. A.:

BULLETIN.

"The following letter from Dr. A. Bostrom, State Veterinarian of Nebraska, gives the most definite information we have been able to secure regarding the disease affecting horses in Nebraska and Kansas.

Lincoln, Nebr., Sept. 18, 1912.

"Prof. J. J. FERGUSON,
Chicago, Ill.

"DEAR SIR—The epizootic disease among horses in Nebraska extends over two-thirds of the state. Horses take the disease in the sand hills and dry sections as well as in the low and damp sections. I know of a few cases which have been kept in the barn on dry feed for three weeks, but I know of no livery horses affected as yet, and very few horses in the large cities are affected. We know absolutely nothing concerning the nature, cause, treatment or prevention of this disease.

"The disease is very fatal, *not more than 5% recover*, and these few recoveries, in my opinion, could not be claimed to be due to any treatment. It attacks horses of all ages, but mostly young horses between two and six years old. Most of the horses die within 48 hours, a few linger for a week or more, and some die in about 12 hours.

"Derangement of the central nervous system is shown in the earliest stage, such as somnolence, stupidity, muscular tremors of the face and neck, grinding of the teeth, paralysis of the muscles of deglutition, and generally of one side of the head and neck, later muscular inco-ordination of the limbs, falling down and generally remaining flat on the side without showing any evidence of pain. Some exhibit rabiform symptoms. The visible mucous membranes are congested with petechia, especially on the membrane nictitans. Temperature in the early stage is generally between 103 and 106, respiration and pulse nearly normal. Later temperature goes down, respirations increased and abnormal, pulse decreasing and at last imperceptible.

"Post mortem lesions show evidence of inflammation of the brain, spinal cord and also of the meninges, hemorrhagic infarcts in the lungs and petechial hemorrhage in the spleen, yellowish infiltration of the connective and fat tissues of the body.

"Hoping that this will give you the desired information, I remain,

"Yours truly (signed) A. BOSTROM."

VETERINARY MEDICAL ASSOCIATION MEETINGS.

In the accompanying table the data given is reported by many Secretaries as being of great value to their Associations, and it is to be regretted that some neglect to inform us of the dates and places of their meetings.

Secretaries are earnestly requested to see that their organizations are properly included in the following list :

Name of Organization.	Date of Next Meeting.	Place of Meeting.	Name and Address Secretary
Alabama Veterinary Med. Ass'n..	August, 1913 ..	Auburn.....	C. A. Cary, Auburn.
Alumni Ass'n, N. Y.-A. V. C....	141 W. 54th St.	New York, N.Y.	J. F. Carey, East Orange, N.J.
American V. M. Ass'n.....	1913.....	New York, N.Y.	C. J. Marshall, Philadelphia.
Arkansas Veterinary Ass'n.....	1st and 3d Thur.	Lec. Room, La-	J. B. Arthur, Russellville.
Ass'n Médécalle Veterinaire Fran-	of each month	val Un'y, Mon.	J. P. A. Houde, Montreal.
caise "Laval"	2d Fri. ea. mo.	Chicago.....	H. A. Smith, Chicago, Ill.
B. A. I. Vet. In. A., Chicago.....	3d Mon. ea. mo.	S. Omaha, Neb	E. J. Jackson, So. Omaha.
B. A. I. Vet. In. A., So. Omaha ..	Sept. 11, 1912....	Fresno	John F. McKenna, Fresno.
California State V. M. Ass'n.....	June and Nov...	Ottawa	A. E. James, Ottawa.
Central Canada V. Ass'n.....	2d Tues. ea. mo	Syracuse	W. B. Switzer, Oswego.
Central N. Y. Vet. Med. Ass'n.....	Jan., 1913	Chicago	D. M. Campbell Chicago.
Chicago Veterinary Society.....	Feb. 6, 1912....	Denver	B. F. Kaupp, Ft. Collins.
Colorado State V. M. Ass'n.....	Jan. Apl Jy. Oct.	Hartford	B. K. Dow, Willimantic.
Connecticut V. M. Ass'n.....	3d Mon. ea. mo.	Wilming'tn ..	A. S. Houchin, Newark, Del.
Delaware State Vet. Society.....	.....	Newark, N. J.	J. F. Carey, East Orange, N.J.
Essex Co. (N. J.) V. M. A.....	.....	Atlanta.....	J. H. Taylor, Henrietta.
Genesee Valley V. M. Ass'n.....	2d Sat. ea. mo..	Wash., D. C..	P. F. Bahnsen, Americus.
Georgia State V. M. A.....	.....	Boise	A. T. Ayers.
V. M. A. of Geo. Wash. Un'y.....	.....	Chicago	Louis F. Cook, Cincinnati.
Hamilton Co. (Ohio) V. A.....	D-c. 5-6, 1912..	Indianapolis ..	G. E. Noble, Boise.
Idaho Ass'n of Vet. Graduates.....	Jan. 15-16, 1913..	Topeka	L. A. Merillat, Chicago.
Illinois State V. M. Ass'n.....	January, 1913...	Lexington	A. F. Nelson, Lebanon.
Indiana Veterinary Association..	Oct. & Feb. ea. yr.	Lorain, O.....	C. H. Stange, Ames.
Iowa Veterinary Ass'n.....	Oct 8-12, 1912..	Skowhegan....	J. H. Burt, Manhattan.
Kansas State V. M. Ass'n.....	October, 1912..	Baltimore.....	Robert Graham, Lexington.
Kentucky V. M. Ass'n.....	4th Wed. ea. mo.	Young's Bost'n	E. H. Yunker, Phila.
Keystone V. M. Ass'n.....	Feb. 6-8, 1912..	Mich. Agr. Col.	Phil. H. Fulstow, Norwalk, O.
Lake Erie V. M. Association.....	July 10-11, 1912.	Minneapolis...	E. P. Flower, Baton Rouge.
Louisiana State V. M. Ass'n.....	.....	G. Ed. Leech, Winona.	C. W. Watson, Brunswick.
Maine Vet. Med. Ass'n.....	.....	Wm. P. Ferguson, Grenada.	H. H. Counselman, Sec'y.
Maryland State Vet. Society.....	.....	Hal. C. Simpson, Denison, Ia.	J. H. Seale, Salem.
Massachusetts Vet. Ass'n.....	.....	S. Stewart, Kansas City.	Judson Black, Richmond.
Michigan State V. M. Ass'n.....	.....	A. D. Knowles, Livingston.	G. Ed. Leech, Winona.
Minnesota State V. M. Ass'n.....	.....	W. H. Tuck, Weeping Water.	Wm. P. Ferguson, Grenada.
Mississippi State V. M. Ass'n.....	.....	Utica	Hal. C. Simpson, Denison, Ia.
Missouri Valley V. Ass'n.....	.....	Salisbury.....	S. Stewart, Kansas City.
Missouri Vet. Med. Ass'n.....	.....	Fargo	A. D. Knowles, Livingston.
Montana State V. M. A.....	.....	Lima	W. H. Tuck, Weeping Water.
Nebraska V. M. Ass'n.....	.....	Up'r Sandusky	H. J. Milks, Ithaca, N. Y.
New York S. V. M. Soc'y.....	.....	Okla. City....	M. J. Ragsdale, Salisbury.
North Carolina V. M. Ass'n.....	.....	Toronto	C. H. Babcock, New Rockford.
North Dakota V. M. Ass'n.....	.....	Wilkesbarre...	A. J. Kline, Wauseon.
North-Western Ohio V. M. A.....	.....	Manila	Reuben Hilty, Toledo.
Ohio State V. M. Ass'n.....	.....	Portland, Ore.	F. F. Sheets, Van Wert, Ohio.
Ohio Soc. of Comparative Med..	.....	Mon. and Que.	J. C. Howard, Sullivan.
Ohio Valley Vet. Med. Ass'n.....	.....	Providence...	C. E. Steel, Oklahoma City.
Oklahoma V. M. Ass'n.....	.....	Centralia.....	H. H. Sweetapple, Toronto.
Ontario Vet. Ass'n.....	.....	St. Louis.....	John Reichel, Glenolden.
Pennsylvania State V. M. A.....	.....	Reading	David C. Kretzer, Manila.
Philippine V. M. A.....	.....	Philadelphia..	Sam. B. Foster, Portland, Ore.
Portland Vet. Med. Ass'n.....	.....	Aberdeen.....	Gustave Boyer, Rigaud, P. Q.
Province of Quebec V. M. A.....	.....	Los Angeles..	J. S. Pollard, Providence.
Rhode Island V. M. Ass'n.....	.....	407 Ill. Ave....	Clarence E. Smith, Greenville.
South Carolina Ass'n of Veter'ns	.....	Fort Worth...	F. Hockman, Louisville.
So. Illinois V. M. and Surg. A.....	.....	St. P.-Minneap	Wm. T. Conway, St. Louis, Mo.
St. Louis Soc. of Vet. Inspectors.	.....	Logan	B. G. Huyett, Wernersville.
Schuykill Valley V. M. A.....	.....	514-9th St.,	W. T. Woodward, Wash'n, D.C.
Soc. Vet. Alumni Univ. Penn.....	.....	N. W.....	S. W. Allen, Watertown.
South Dakota V. M. A.....	.....	Winnipeg.....	J. A. Dell, Los Angeles.
Southern Auxiliary of California	.....	Jer ey City....	H. R. Collins, So. St. Joseph.
State V. M. Ass'n.....	.....	141 W. 54th St.	A. C. Topmiller, Murfreesboro
So. St. Joseph Ass'n of Vet. Insp..	.....	Jersey City....	R. P. Marsteller, College Sta
Tennessee Vet. Med. Ass'n.....	.....	Newport News	S. H. Ward, St. Paul, Minn.
Texas V. M. Ass'n.....	.....	Pullman.....	A. J. Webb, Layton.
Twin City V. M. Ass'n.....	.....	Wenatchee....	G. T. Stevenson, Burlington.
Utah Vet. Med. Ass'n.....	.....	Pittsburgh....	C. H. H. Sweetapple, For.
Vermont Vet. Med. Ass'n.....	.....	Ja esville.....	Saskatchewan, Alta., Can.
Veterinary Ass'n of Alberta.....	.....	York.....	M. Page Smith, Wash., D.C.
Vet. Ass'n Dist. of Columbia.....	.....		F. Torrance, Winnipeg.
Vet. Ass'n of Manitoba.....	.....		E. L. Loblein, New Brunswick.
Vet. Med. Ass'n of N. J.....	.....		R. S. MacKellar, N. Y. City.
V. M. Ass'n, New York City.....	.....		A. F. Mount, Jersey City.
Veterinary Practitioners' Club..	.....		Geo. C. Faville, Norfolk.
Virginia State V. M. Ass'n.....	.....		R. J. Donohue, Pullman.
Washington State Col. V. M. A ..	.....		Carl Cozier, Bellingham.
Washington State V. M. A.....	.....		Benjamin Gunner, Sewickley
Western Penn. V. M. Ass'n.....		J. P. West, Madison.
Wisconsin Soc. Vet. Grad		E. S. Bausticker, York, Pa.
York Co. (Pa.) V. M. A.....		

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